BY ORDER OF THE COMMANDER 301ST FIGHTER WING

301ST FIGHTER WING INSTRUCTION 13-212

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Nuclear, Space, Missile, Command and Control

RANGE PLANNING AND OPERATIONS

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This 301st Fighter Wing (301FW) Instruction extends the guidance of Air Force Instruction (AFI) 13-212, *Range Planning and Operations*, 16 November 2007. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the Air Force (AF) Form 847, *Recommendation for Change of Publication*; route AF Form 847s from the recommending office thru the 301FW Publications/Forms Managers (301 CF/SCBP) to Higher Headquarters as necessary. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located in Air Force Records Information Management System (AFRIMS) at the Air Force (AF) Portal: **https://my.af.mil/afrims/afrims/afrims/rims.cfm**. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF CHANGES

This document has been substantially revised and should be reviewed thoroughly. Major changes to document contents include a total restructuring of the document into separate paragraphs; addition of the local area map; assigning HQ AFRC/A3V as the MAJCOM reporting agency; definition of the Quanah Impact Area; clarification of operating times; target area and array descriptions updated; unmanned and manned moving targets added; airspace map added; clarification of airspace requests outside of normal range boundaries; Sheppard MOA Area 8

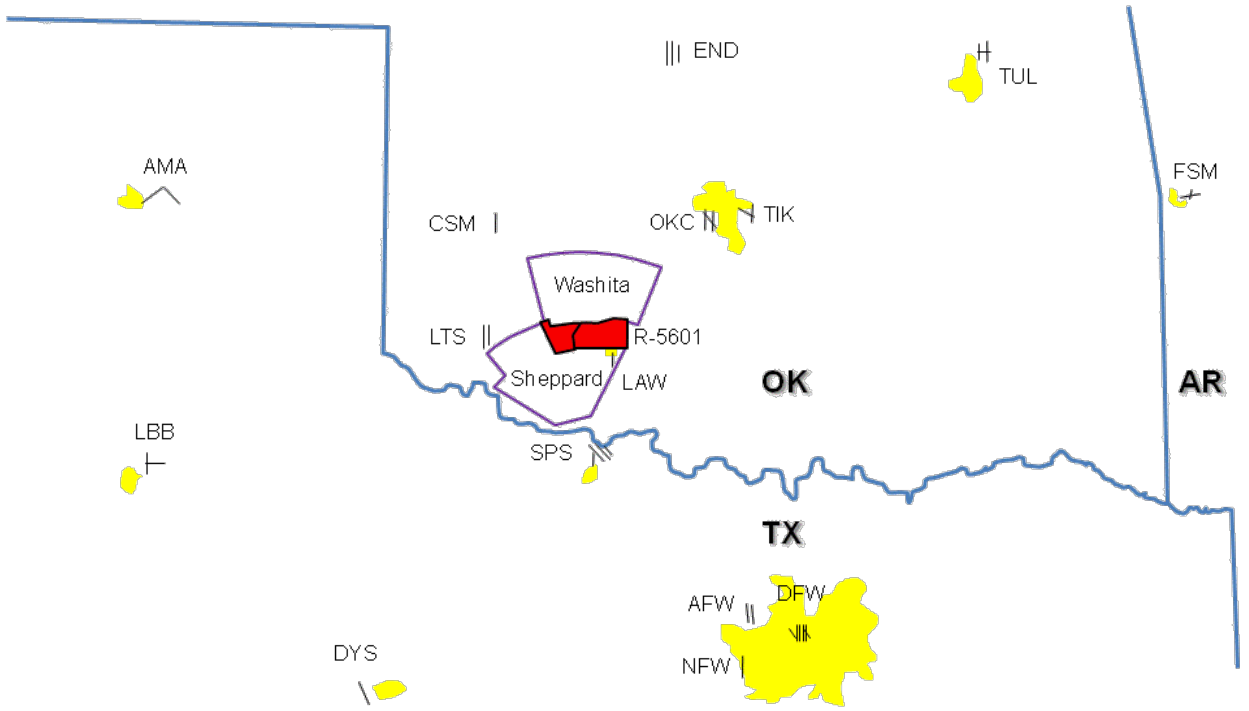
divided into Areas 8 and 9; nearby remotely piloted vehicle runway updated; RFMSS scheduling added; RCO procedures updated; laser flight profile table added; new LSVRS laser scoring system procedures added; inertially-aided munitions procedures added; directed-energy weapon prohibition added; West Range procedures updated; local area aeronautical chart updated with new graphics; target area map updated to reflect new target arrays; manned sites and radar offset aimpoints added as a separate attachment; laser target area changes.

Chapter 1

RESPONSIBILITIES AND SCHEDULING

1.1. General. The contents of this chapter are governed by paragraph 2.5.14 of AFI 13-212 and provide supplemental information for the conduct of operations on Falcon Range. The Commander, 301st Operations Group (301OG) (DSN 739-6910) is responsible for operational control of Falcon Range. The 301st Operations Group Commander (301 OG/CC) monitors range flying and ground support operations to ensure effectiveness and safety. All personnel will comply with this chapter when operating aircraft or performing ground duties within the confines of Falcon Range. The range lies within R-5601, and is part of the Fort Sill range complex in southwest Oklahoma. The US Army Fires Center of Excellence maintains control and scheduling of the ground space and is the scheduling and controlling agency for the R-5601 air space. (**Figure 1.1**)

Figure 1.1 Falcon Range Local Area



1.1.1. The Range Operating Authority (ROA) is the 301st Operations Support Flight (OSF) Commander. The ROA is responsible for the funding and long-range planning of the range, in addition to the duties prescribed in AFI 13-212, Chapter 2.

1.1.2. The Range Operations Officer (ROO) is responsible for the safe and successful completion of missions flown on Falcon Range and the supervision of management, planning and maintenance. The ROO has authority over all ground operations and support functions on the range. The ROO will be a fully-qualified Range Control Officer.

1.1.3. The Range Control Officer (RCO) is directly responsible for the conduct of air-to-surface operations and is primarily responsible for all range operations and air/ground safety during range operations.

1.2. Scheduling. The range scheduler is responsible for determining range availability and submitting requests through the Range Facility Management Support System (RFMSS) at Fort Sill. The ROO, or RCO in the absence of the ROO, resolves conflicts in range utilization with all users.

1.2.1. Units will schedule range periods and request changes through Falcon Range (DSN 639-6300 / FAX DSN 639-7421). An alternate phone number is (580) 442-2043 / DSN 639-2043. Range scheduling requests should be submitted by the 15th of the month (or first work day after the 15th if weekends or holidays preclude accepting requests on the 15th) for the following month's flying schedule (e.g. March 15th for April schedule). Requests for night or weekend flying activities must be scheduled at least two weeks in advance to ensure airspace and personnel are properly scheduled. Falcon Range can accept short notice requests, subject to range availability. Requests received after the 15th of the month will be scheduled if range time is still available at the requested time. Late arrivals and/or cancellations must be coordinated with Falcon Range as soon as possible. Priority (in order) shall be given to real-world contingency (AEF) training (deploying within 120 days), higher headquarters-directed exercises (such as ORIs), the host unit (301st FW/457th FS), secondary users as defined by the Inter-Service Support Agreement, and finally to casual users. Requests of equal priority will be considered in order of receipt. The scheduler and ROO will resolve time conflicts in a fair and equitable manner based on priorities. The scheduler will then provide a copy of the monthly schedule to all users.

1.2.2. Special events, such as expending heavyweight inert ordnance or utilizing laser operations, require coordination prior to range time. Users will contact Falcon Range as soon as possible with these and other special requests.

1.2.3. Users will relay the planned lineup and events to Falcon Range through either telephone (DSN 639-6300 or -2043/Comm (580) 442-6300 or -2043) or FAX (DSN 639-7421/Comm (580) 442-7421) in order to facilitate efficient handling of the range events. This should be accomplished at least one hour before arrival, if feasible. Information should include, but is not limited to, call sign, number and type of aircraft, pilot numbers (if applicable), weapons delivery events, and targets.

1.2.4. Falcon Range mailing address is:

Falcon Range

P.O. Box 620

Cache, OK 73527

1.2.5. Cancellations and scheduling efficiency. Units canceling their range time will do so as soon as they find out about the cancellation. This allows other users the range time if needed, the ARTCC to release the airspace if required, and allows maintenance on the range.

1.2.5.1. Users will accurately forecast and schedule their needs. For example, units should not schedule 90-minute range periods while intending to only utilize the last 10 minutes as a matter of scheduling convenience.

1.3. Maintenance. Range maintenance documentation is maintained at Falcon Range. The ROA is responsible for obtaining support from outside sources for projects beyond the capability

of the Falcon Range detachment. Falcon Range scheduling will notify users of expected closures at least 30 days in advance, if feasible.

1.4. Decontamination/Disposal. The ROA is responsible for scheduling range residue removal. The range contractor is responsible for the execution of the de-militarization, removal, and disposal of range residue.

1.5. Reports. The weapons scoring systems generate hard-copy score sheets. The completed forms will be forwarded to the appropriate unit using the agreed media, usually via fax.

1.5.1. Falcon Range personnel will compile and submit the Range Resources Utilization Data Reports monthly to the ROA, which will forward this data through channels to HQ AFRC/A3V.

1.6. Command and Control. Command and control is exercised through Fort Sill. The RCO receives control of the range and R-5601C/D/E/F from Fort Sill Range Control (DSN 639-2994 or -2008) prior to the first range period. The RCO returns control to Fort Sill during periods of administrative downtime and at the end of the day.

1.7. Support Agreements. Copies of support agreements are kept on file at the 301st OG. Additionally, the DOL Directorate at Fort Sill is responsible for the initiation and coordination of support agreements with tenant users.

1.8. Firefighting. Fires will be serviced by the Fort Sill Fire Department in accordance with the current support agreement. RCOs will report all fires to Fort Sill Range Control at DSN 639-2994/-2008. Only the Fort Sill Fire Chief can determine if a fire is minor or not. When practical, a Falcon Range RCO or contract employee will accompany the Fire Department down-range for orientation and safety.

1.8.1. Fort Sill Range Control will provide the specific pyrotechnic restriction status daily or more often if conditions change. Range Control may require a cessation of operations due to increased fire danger. This may be a result of high winds, dry weather conditions, over-tasked Fort Sill or local firefighting equipment, or warnings issued by the National Weather Service. In the event of such conditions, the Fort Sill Fire Chief will issue a series of alerts through Range Control. The standard Fort Sill pyrotechnic restrictions are Green, Amber, Red, and Black.

1.8.1.1. Green: All ammunition cleared for use may be expended.

1.8.1.2. Amber: Partial restrictions apply; all ordnance must remain within the impact area.

1.8.1.3. Red: No pyrotechnics may be used. This is often referred to as a “RED PYRO” alert. No white phosphorous, illumination, smoke, or tracer ammunition may be employed. EOD detonations are prohibited. No visual threat simulators such as AAA pyrotechnics will be fired. Only cold-charge training munitions, training munitions with the spotting charge removed in accordance with T.O. 11A3-3-7, inert weapons or TP ammunition may be expended. Dry attacks may still be conducted, and there are no restrictions on the use of lasers. Countermeasure flares may only be employed above 1000’ AGL / 2500’ MSL (or higher if required to ensure burnout before ground impact).

1.8.1.4. Black: No releases of any sort. The combination of humidity, available fuel, and winds raises an extreme danger of range fires, and a spark from a metal-on-metal or

metal-on-rock hit may cause an out-of-control range fire. Dry attacks may still be conducted, and there are no restrictions on the use of lasers. Countermeasure flares may only be employed above 1000' AGL / 2500' MSL (or higher if required to ensure burnout before ground impact).

1.9. Recommended Changes. Recommendations for change to this annex will be submitted on an AF IMT 847, Recommendation for Change of Publication to the 457th Fighter Squadron, at 1790 Carswell Avenue, NAS JRB Fort Worth, TX 76127-6200.

1.10. Prescribed Forms.

Air Force (AF) Form 847, *Recommendation for Change of Publication*

Chapter 2

RANGE DESCRIPTION AND INFORMATION

2.1. General. Falcon Range is a Class A (manned) conventional and tactics range approved for both day and night weapons delivery. The range is located on the Fort Sill Military Reservation at N34° 39.4' W98° 42.6', SPS (CH 74) 343°/041 NM. The range impact area lies entirely within the Fort Sill Quanah Range Impact Area (QRA). The mean target area elevation is 1400 feet MSL. Normal hours of operation are 0730-1800 CST/CDT Monday-Friday. Operations outside these periods require prior coordination. Refer to paragraph 1.2 for details.

2.1.1. Range Layout. Falcon Range is a single range consisting of a conventional bomb circle, tactical target arrays, laser targets, and multiple mobile tactical targets. Infrared (IR) targets are available with prior coordination and approval. Ground and airborne laser designator use is approved. See Attachment 4, Falcon Range Target Layout Diagram. The Target Area is defined by the Fort Sill Quanah Range Dud Area. The Hazard Area is defined by the Fort Sill Quanah Range Impact Area.

2.2. Weather. Falcon Range possesses weather observation and reporting equipment. This provides immediate weather reporting capability to include ceiling and visibility, type of obscuration, lightning data, surface winds, and precipitation. It does not report upper level winds. Falcon Range cannot provide official forecasts and/or observations but can relay existing conditions and out-the-window observations. Pilots should contact their official weather facility for relevant nearby forecast information.

2.3. Scoring. Bomb impacts are optically plotted and scored by computer using the Weapons Impact Scoring Set (WISS). When the computer system is not working or uninstalled, bomb impacts are mechanically plotted by optical triangulation and scored by computer. WISS allows digital and tape playback for verification and replots, and a score for each weapon during multiple releases, if the impact is within the camera field of view. WISS also allows video recordings for viewing later. Aircrews who want to have a visual record of their deliveries can coordinate with the RCO for a video backup, and it can be made in the desired format, if feasible.

2.3.1. Accuracy. Nominal scoring accuracy is 1.5 meters. Bombs plotted three meters or less (computed deliveries) or five meters or less (manual deliveries) are scored as a "bull" or "shack". Scoring accuracy decreases as a function of target distance from the main and flank towers. The targets on range are either point or area. Most targets are of the point variety, but some, such as T-3SE, T-5NW, T-7C, some of the T-9 targets, and T-17 are area targets. Linear targets such as aircraft will have similar scoring, but on a smaller scale. Hits are based on the center of the target, so a hit on a building or bridge may visually be a direct hit but still score as a close miss (7 meters, for example).

2.3.2. RCOs transmit scores using distance/clock position ("7 [meters] at 2 [o'clock]") based on the briefed attack heading. Inform the RCO if the attack heading varies from the standard 080° run-in; weapons scores will be adjusted.

2.3.3. Each scorable target can be scored day or night. Night missions require hot charges (e.g. Mk-4) since scoring requires a visible flash within the camera field of view. Cold charges or inert weapons will not be visible at night. Coordinate desired targets with the RCO prior to complex missions or deliveries to prevent confusion. Certain wind or visibility

conditions may limit the effectiveness of the scoring system due to target obscuration. Additionally, wet conditions in the target area may preclude accurate daytime scoring of inert munitions and "duster" training rounds.

2.3.4. WISS can score only one target area/complex at a time. Multiple Desired Points of Impact (DPIs) require coordination for manual scoring backup. Some targets allow the use of one camera system for multiple target arrays. This gives flight leads flexibility when planning attacks on separate DPIs. Suitable target pairs are T-3 and T-4, T-5 and T-18, T-6 and T-17, and T-14 and T-15.

2.4. Target Arrays. The conventional target is T-1. Target arrays T-2 through T-25 are tactical targets located throughout the range complex. Refer to Attachments 4 through 9 for target area details, run-in headings, authorized ordnance, etc.

2.4.1. Target Array 1 (T-1), Conventional Bomb Circle. The bomb circle is an outlined graded circle of 91 meters (300 feet) radius. It has two concentric circles of white tires at 23 meters (75 feet) and 45 meters (150 feet) radius. The center of the circle has a clearly identifiable target for aiming reference (usually a small POL tank, but also may be a salvaged vehicle, commo box, or stack of tires.) The target is painted to contrast with the surrounding area. The DPI is the center of the aiming reference. Additionally, there are three white aim points (highly visible markers) located 12 o'clock from the target on a 080º bearing at 1000, 1500, and 2000 feet. These are used only for aim-off distance reference.

2.4.2. Tactical Target Arrays: Several target sites are available for tactics training, employing sub-scale or inert munitions or for TGP attacks. Several of these targets are not visible from the control towers, resulting in the inability to provide attack results and/or weapons deliveries scores. When identified, dimensions are east-west by north-south. Target descriptions in this instruction may change due to target change-out as a result of damage, or due to target area upgrades. Changes will be made available on the range web pages as range NOTAMs.

2.4.2.1. Target Array 2 (T-2), North Ramp. The North Ramp is a graded east-west rectangle approximately 100 x 85 meters. This target array has ten major DPIs in a circular configuration. T-2W and T-2NW are two 8-inch howitzers. T-2N and T-2NE are buildings oriented east-west. T-2E1 and T-2E2 are vehicles. T-2S is a rocket launcher and T-2SE is a radar/communications van. T-2C is a small shack in the center of the array with a number of barrels immediately adjacent, and T-2SW is a mortar pit on the southwest corner of the array. Several full-sized mannequins and personnel simulators complete the array. This target array is suitable for inert heavyweight deliveries. Care must be exercised so as not to drop on the LTA 500 meters north. Refer to Attachment 5, Target Array Details, for details.

2.4.2.2. Target Array 3 (T-3), East Ramp. The East Ramp is a graded rectangle 85 x 70 meters. This target array has four individual DPIs, including an SA-6 TEL (T-3NW), a fighter aircraft (T-3NE), an aircraft shelter or bunker constructed of Sea-Land containers (T-3SE) and a security detail vehicle/BMP-2 (T-3SW). Refer to Attachment 5 for a detailed target array diagram.

2.4.2.3. Target Array 4 (T-4), POL Site. This target array is comprised of several POL tanks (T-4N). A road connects the site to the runway. A refueling pump station and

service vehicle (T-4S) is located 25 meters south of the POL tanks. Pilots need to specify whether they are attacking the west or east DPI of the POL. Refer to the run-in restrictions for this target.

2.4.2.4. Target Array 5 (T-5), West Ramp. The West Ramp array resembles a dispersed, revetted alert aircraft parking and munitions holding area. The approximate dimensions of this target are 120 x 100 meters. This ramp has five individual DPIs, consisting of two alert aircraft (T-5E and T-5W), a fuel truck (T-5S), plus a munitions storage area (T-5NW). An aircraft on the taxiway (T-5NE) completes the array. Refer to the run-in restrictions for this target. Refer to Attachment 5 for a detailed target array diagram.

2.4.2.5. Target Array 6 (T-6), Howitzer Row and POL. This target array consists of nine separate DPIs. The western howitzers (T-6W1, T-6W2, and T-6W3) are comprised of three self-propelled howitzers at the west end of an east-west graded area of approximately 225 x 30 meters. An ammo support site (T-6A) and a small support building (T-6B) are located east of the howitzers. The POL site (T-6C) is three POL tanks sited vertically in the middle of the array. T-6D is a single howitzer located immediately north of T-6C. T-6E is an APC providing security at the east end of the array. A single SA-13 target (T-6N) is located 90 meters northeast of T-6C. Refer to Attachment 5 for a detailed target array diagram.

2.4.2.6. Target Array 7 (T-7), Base Operations. The Base Operations array is inside an irregular graded area approximately 90 x 90 meters. This target has four individual DPIs, consisting of a building 13 meters high constructed of Sea-Land containers (T-7C), a Jeep (T-7NW), a base ops/FOLLOW ME truck (T-7NE), and a small helicopter (T-7SE). Scoring of T-7C is from the center of the building; it is possible to hit the building and still receive a score of 7-10 meters. It is not a point target. Refer to Attachment 5 for a detailed target array diagram.

2.4.2.7. Target Array 8 (T-8), Armored Vehicles. This target array has two individual sets of DPIs, consisting of armored vehicle assembly areas. Scoring is not available; T-8N and T-8S are scored to Hit or Miss only. The DPI areas are separated by 350 meters north-south.

2.4.2.8. Target Array 9 (T-9), Village. This target array consists of 15 small buildings and vehicle targets which represent an insurgent camp or village. The actual DPI must be identified for accurate scoring. Some of the buildings are constructed of Sea-Land containers and are linear targets. Scoring is from the center of each structure or target. Refer to Attachment 5 for a detailed target array diagram.

2.4.2.9. Target Array 10 (T-10), Helicopter. This single helicopter target and support truck is not visible from the range control towers.

2.4.2.10. Target Array 11 (T-11), Vehicles. This cluster of four vehicles is not visible from the range control towers. T-11W consists of two vehicles near a pond. No airborne laser designators are authorized on T-11W due to the close proximity of the pond. T-11NE consists of a technical truck with a ZPU-4 AAA gun mounted in the bed, and T-11SE is a technical truck with a single-shot rocket launcher mounted in the bed and oriented to the southwest. Only T-11NE and T-11SE can be scored, and lasers are authorized on T-11NE and T-11SE.

2.4.2.11. Target Array 12 (T-12), Reinforced Bunker. This target is an earthen mound with a door and lumber abutments on the west side. This target array is suitable for inert heavyweight deliveries. Care must be exercised so as not to drop on the LTA 500 meters north.

2.4.2.12. Target Array 13 (T-13), Runway. The runway on Falcon Range is 7400 feet (1.25 NM) long by 120 feet wide. It is oriented 070/250º, and is covered with gravel to present the appearance of a real runway. Due to the linear design of this target, scoring is not available. The remote moving targets are normally operated on the runway.

2.4.2.13. Target Array 14 (T-14), Alert Aircraft. This target array is adjacent to the north and south side of the runway and replicates two aircraft (T-14N and T-14S) on strip alert. A small alert shack, T-14E, is located 10 meters northeast of T-14N. A second shack, T-14W, is located 15 meters southwest of T-14S. A maintenance truck is located adjacent to the cockpit of T-14S. This target array is located just south of T-15. Scoring is available for these targets. Refer to the run-in restrictions for this target.

2.4.2.14. Target Array 15 (T-15), AAA Site. T-15 is a AAA gun site. It is visually modified to present a ZU-23-2 silhouette. This target is located just north of T-14. Refer to the run-in restrictions for this target.

2.4.2.15. Target Array 16 (T-16), Radar Site. Scoring is available for this Fire Can radar van (T-16A) and support vehicle (T-16B). The TTR dish for the Fire Can is on the west face of the target and points southwest. The DPIs are the centers of the radar van and vehicle. Refer to the run-in restrictions for this target.

2.4.2.16. Target Array 17 (T-17), Bridge. This linear target is constructed from Sea-Land containers and is painted gray with a blacktop-simulating black paint on the top of the bridge. It is approximately 200 feet in length. DPIs are provided for the north, south, and center of the bridge and a single Jeep target located on the top of the bridge. Two vehicles are located on each approach to the bridge, and additional targets are located at the southern end of the bridge. The targets can be scored. Scoring of the bridge is from the portions of the target designated, north, center or south sections; it is possible to hit the bridge and still receive a score of 7-10 meters. It is <u>not</u> a point target. The vehicles are considered point targets but because of their linear nature a hit may still not score as a direct hit. Additionally, because the Jeep is located atop the bridge (7 meters elevation) any long bombs may result in significant miss distances. NO STRAFE OR HEAVYWEIGHT ORDNANCE IS ALLOWED. Refer to Attachment 5 for a detailed target array diagram.

2.4.2.17. Target Array 18 (T-18), ZSU-23-4. This is a single ZSU-23-4 viz-mod located east of T-7. It is at the base of a tree and is camouflaged. Scoring is available for this target. No airborne laser designators are authorized on this target due to the close proximity of a pond.

2.4.2.18. Target Array 19 (T-19), Downed Aircraft Target. This target simulates a downed counterinsurgency or forward air controller-type aircraft. It is a small aircraft located east of the LTA. It is not scored, but is visible from the main and flank tower. Only subscale munitions are authorized. NO STRAFE OR HEAVYWEIGHT ORDNANCE IS ALLOWED.

2.4.2.19. Target Array 20 (T-20), Construction Equipment. This target consists of a utility truck, a dump truck, and a backhoe in the process of building a fighting position.

2.4.2.20. Target Array 21 (T-21), 2 Tactical Vehicles. This target array consists of one viz-mod BM-21 rocket launcher truck and one supply truck.

2.4.2.21. Target Array 22 (T-22), 2 Tactical Vehicles. This target consists of two trucks, one dump truck and one utility truck with a AAA piece mounted on the rear. This target array follows a small creek and is adjacent to some vegetation.

2.4.2.22. Target Array 23 (T-23), 2 Tactical Vehicles. This target consists of two trucks, with the northern truck adjacent to a north-south embankment, and the southern truck within a revetment cut from the embankment. This tactically challenging target array is not visible from the range control towers.

2.4.2.23. Target Array 24 (T-24), 2 Tactical Vehicles. This target consists of two tactical vehicles immediately adjacent to the north side of a clump of trees. This target array challenges acquisition and identification, and is not visible from the range control towers.

2.4.2.24. Target Array 25 (T-25), Convoy. This target depicts a tactical convoy consisting of several light trucks or technical vehicles. It is oriented north-south, and is suitable for High Angle Strafe only.

2.4.3. Mobile Vehicle(s). These are various mobile vehicles which can be placed at selected locations within the Falcon Range airspace, including a working replica of a SCUD missile system. These targets are for IR and TGP use only, and will be at the user's request. The location of these targets will be random, unless a user has a specific location based on a scenario. The coordinates will be sent to users and will be in a format and accuracy based on the user's scenario. Because these are mobile targets, they may be outside the impact area. DO NOT EXPEND ORDNANCE ON THESE TARGETS.

2.4.4. No-Drop Targets. There are several no-drop targets outside the Quanah Dud Area which can be used for dry tactical deliveries. Combat lasers can also be employed against these targets, but no actual ordnance of any kind may be employed. These targets include trucks, construction equipment, and an actual BRDM. These targets are in a fixed location. Refer to the end of Attachment 8 for details.

2.4.5. Moving Targets. In order to accommodate training objectives, the range can provide various moving targets in and out of the impact area.

2.4.5.1. Unmanned moving targets. The range possesses several unmanned vehicles which can be used for attacks with both lasers and training munitions. Generally these use HMMWV or SUV-type vehicles. A GPS-guided vehicle is laser-only, and can be used for combat laser designations only. Additional vehicles are command-guided, using a remote driver to operate the vehicle. In order to maintain footprint control and allow the vehicle an opportunity to turn around, the runway (T-13) is the target area of choice. For munitions employment, pilots can attack a towed target array which consists of a target in the shape of a truck towed 150-200 feet behind the tow vehicle. In order to preserve the tow vehicle for future use, aircrews must only attack the towed array. Contact the range at least two hours prior in order to verify availability. Inert and training munitions as well as 20mm and 30mm strafe may be used.

2.4.5.2. Manned moving targets. Range personnel can operate range vehicles as needed to allow for dynamic tasking within scenarios. Additionally, the range can provide personnel to maneuver throughout the impact area as part of the scenario. Coordinate with the range at least one hour prior to ensure availability and to provide scenario inputs, if needed. Joint Terminal Attack Controller (JTAC) personnel can act as their own scenario inputs with the concurrence of the RCO, but are restricted to gravel roadways and the LTA. No JTAC personnel are allowed into kinetic target arrays. Attacks will be dry with the flight verifying that no ordnance can be employed prior to commencing any attacks. No lasers may be employed at any time unless deemed eye-safe by the 711th HPW/RHDO Optical Radiation Safety Office. Minimum altitudes and ranges will be in accordance with FAA and service directives.

2.4.6. Laser Training Area (LTA). This target area consists of a generic village-type target. Some buildings within the array are constructed of Sea-Land containers and plywood, while others are actual small shack buildings constructed of metal and wood. The area also includes various items associated with cultural buildups, including telephone poles, vehicles of various sizes and types, and a pair of top-down targets constructed of a large tire with high-contrast white gravel, simulating a manhole or hide-site. The scoring system support equipment is located in the middle of the LTA, and two 40' towers which house the laser sensors are located within the LTA. THIS TARGET AREA IS FOR LASER TRAINING ONLY and is not approved for any weapons deliveries. A number of targets can be scored using combat lasers. Refer to Attachment 10 for details.

2.4.7. Offset Aim Points (Radar Reflectors). Two radar-reflective offset aim points (OAPs) are available. These reflectors are optimized for a 080º heading. The north OAP consists of 2 metal radar reflectors and is located 3091 meters north of T-1. The south OAP is located 1378 meters southeast of T-1. Refer to Attachment 7 for coordinates.

2.4.8. Improvised Explosive Devices (IEDs). There is one IED simulator located inside the LTA. This simulator is a steel barrel with a small quantity of coolant in a container for heat contrast. Refer to Attachment 8 for coordinates.

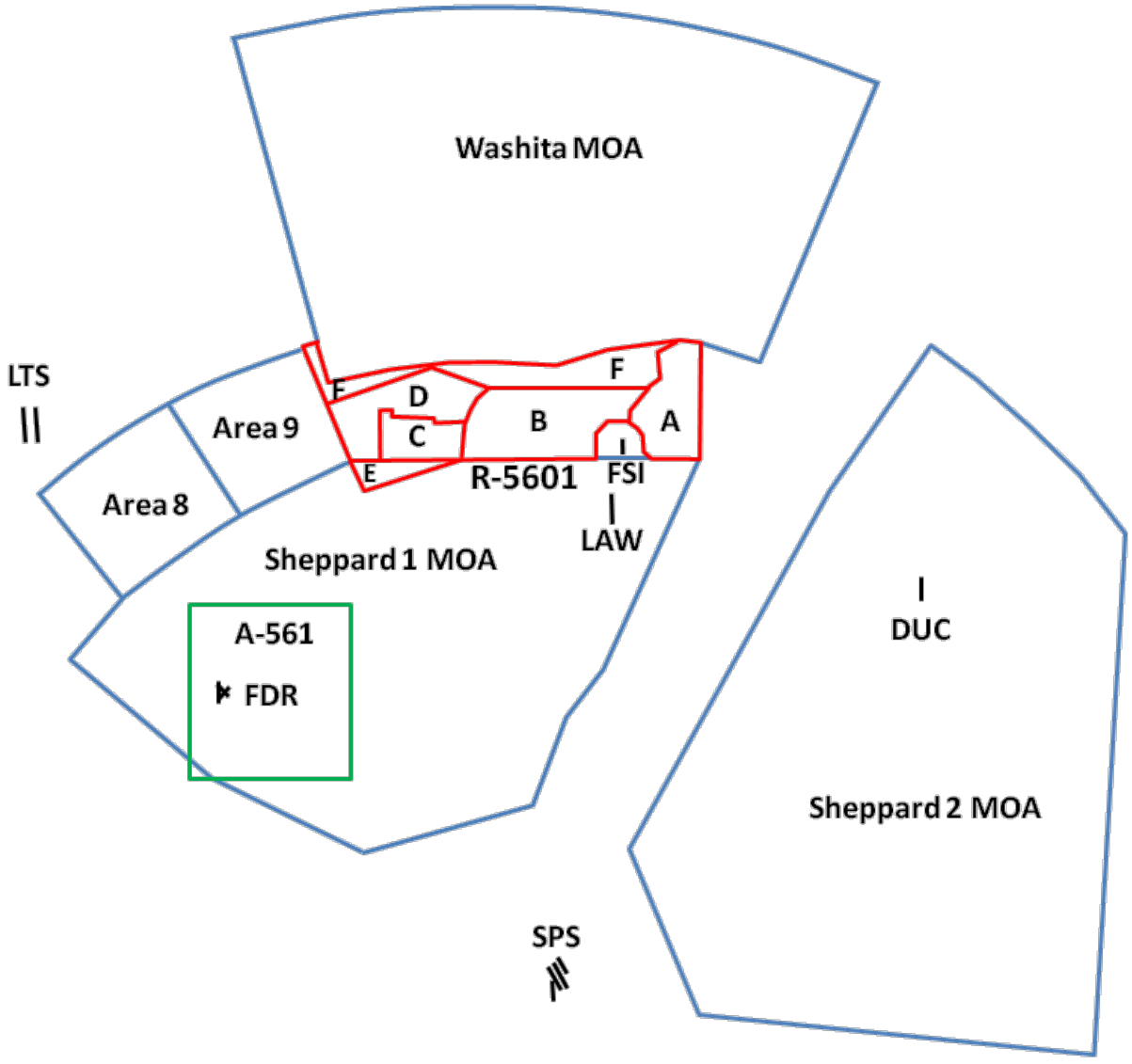
2.5. Strafe Targets. Most tactical targets are available for high angle strafe (greater than 15° dive), employing 20mm, 25mm, and 30mm TP/TPT. Contact the RCO or refer to Attachment 8 and Attachment 9 for details. The low angle strafe targets are located 500 meters WSW of the bomb circle and consists of two strafe targets oriented north-south mounted between telephone poles and separated by 40 meters. These targets consist of drag or cargo extraction parachutes; generally only one will be raised. Low and high angle strafe passes are acoustically scored using the Improved Remote Strafe Scoring System (IRSSS). The scoring system requires a reset time after logging bullet impacts. Allow at least 30 seconds between aircraft on the same target or else the system may not accurately score the impacts. A foul line consisting of two rows of white-painted barrels with marking poles is oriented north-south and is located 2000 feet west of the strafe pits. A line of barrels leads into the strafe target area from west-to-east. Additionally, 25 meters south of the two low-angle strafe targets is a single high-angle strafe target that is also acoustically scored. It consists of a target on a three-foot high mound of soil. Contact the RCO with the type of ammunition being used. The run-in heading for both low angle strafe and high-angle strafe on the dedicated strafe targets is 080° ± 10°. See Attachment 5 for diagrams.

2.5.1. The low-angle strafe targets will be closed if standing water accumulates in the strafe beds or if the strafe pits are frozen, as this increases the risk of ricochets and invalidates the weapons footprints. The strafe beds will be maintained in accordance with the schedule of AFI 13-212 Chapter 7, or as directed by the RCO based on the strafe bed conditions.

2.5.2. Low-angle strafe fouls are validated with a camera and recorder system. The RCO immediately observes the cease-fire ranges for strafe, and records the cease fire range for later review.

2.6. Range Real Estate and Airspace Restrictions. Falcon Range is located on the Fort Sill Military Reservation. The air and ground space is part of the US Army Fires Center at Fort Sill, which is the scheduling agency. When the airspace has been activated by Fort Sill, the Falcon Range Control Officer controls only the airspace overlying Falcon Range (R-5601C/D/E and the western portion of R-5601F adjacent to C/D/E). Do not enter the range without clearance from the Range Control Officer. Refer to **Figure 2.1, Local Airspace**.

Figure 2.1, Local Airspace



2.6.1. Fort Sill Artillery Areas. R-5601A/B (east of the Falcon Range impact area and east of highway 115) extends from surface to 40,000 feet. These restricted areas are not part of Falcon Range. R-5601B is often referred to as "West Range". Do not penetrate this airspace without clearance from Fort Sill Approach Control, the JTAC (as coordinated prior to the range events), or through the Falcon Range RCO. R-5601A/B may be used for overflight in order to employ weapons and lasers from the east with prior coordination at least one day prior. The airspace may not be available on a short-notice basis. If authorized to operate in R-5601A/B it is essential that altitude restrictions be followed precisely when surface fires such as artillery and small arms are employed below.

2.6.2. Falcon Range. R-5601C/D/E and the western portions of R-5601F overlay the Falcon Range Complex. See Attachment 3, Restricted Area R-5601C/D/E/F Map, for restricted area airspace boundaries.

2.6.2.1. R-5601C (defined generally as overlying the Falcon Range impact area) normally extends from surface to 24,000 feet MSL. Up to 40,000 feet MSL is available upon request. Users requiring the higher airspace must contact Falcon Range at least one day prior to the scheduled range period for this additional vertical airspace.

2.6.2.2. R-5601D (north and west of the impact area) extends from 500 feet AGL to 24,000 feet MSL. Up to 40,000 feet MSL is available with one-day prior coordination. Users requiring the higher airspace must contact Falcon Range at least one day prior to the scheduled range period for this additional vertical airspace. This area overlies the Wichita Mountains Wildlife Refuge. When practical, the minimum altitude when flying over the refuge is 3000 feet AGL / 5500 feet MSL.

2.6.2.3. R-5601E (south of the impact area) extends from 500 feet AGL to 6000 feet MSL. R-5601E lies underneath the Sheppard 1 MOA with a 2000-foot buffer which may also be used as a VFR transition corridor.

2.6.2.4. R-5601F (north and east of the impact area) extends from 500 feet AGL to 24,000 feet MSL. Up to 40,000 feet MSL is available with one-day prior coordination. R-5601F connects the Washita MOA with the R-5601C/D (Falcon Range) and R-5601A/B (Fort Sill West Range), allowing increased maneuverability and tactical flexibility.

2.6.3. Sheppard AFB controls two adjacent MOAs:

2.6.3.1. The Sheppard 1 MOA, located directly south of Falcon Range, extends from 8000 feet MSL – FL220. Avoid this high-density student training area unless in contact with Sheppard Area Monitor (236.825) or if approved for use of Sheppard Areas 8 and 9.

2.6.3.2. The Washita MOA, located directly north of Falcon Range, extends from 8000 feet MSL – FL220. Avoid this high-density student training area unless in contact with Fort Worth Center (269.375), or unless scheduled and authorized to use it as part of a Falcon Range or Fort Sill scenario.

2.6.3.3. Sheppard Areas 8 and 9 are located in the extreme northwest part of the Sheppard 1 MOA. These sub-areas may be used in conjunction with R-5601 when Sheppard AFB has activated the MOA. The area is depicted in Attachment 2 and is approximately 10 NM northwest/southeast by 20 NM northeast/southwest. This allows aircraft to operate within special use airspace during operations at Falcon Range.

2.6.3.3.1. Sheppard Areas 8 and 9 may be requested any time the Sheppard MOA is active. Contact the RCO to ensure it is available other times. Allow at least one hour for coordination. Sheppard training has priority within the airspace; if Sheppard is using the airspace for primary training it may not be available. If the airspace is allocated to allow operations with R-5601 then Sheppard AFB aircraft will be prohibited from operating within Areas 8 and 9.

2.6.3.3.2. Use the Falcon Range frequency for operations in Areas 8 and 9.

2.6.4. The Altus AFB visual and instrument patterns, oriented north/south, are situated east of Altus AFB. The Altus TRSA is approximately 10 NM west of the range boundary and extends from 3500 feet MSL to 7000 feet MSL. Expect to see a variety of large transport aircraft in this pattern.

2.6.5. The terrain rises sharply to over 2500 feet MSL three miles north of the impact area in R-5601D.

2.6.6. There is a lighted tower with guy wires located two miles south of the range on the edge of the restricted area, located at N 3438.400 W 09841.510, and at 1675' MSL / 330' AGL.

2.6.7. Do not overfly the main tower (70 feet AGL) or flank tower (85 feet AGL). Avoid hot attacks with final headings in the direction of manned sites.

2.6.8. An inactive Remotely Piloted Aircraft (RPA) airfield is immediately adjacent to the southwest part of R-5601C and underneath the western part of R-5601E. The site consists of a north-south runway 2200 feet in length, and an east west 1500-foot runway. If it is ever activated it can be used to launch and recover unmanned aerial vehicles. It will usually be closed when Falcon Range is active with fixed-wing aircraft, but circumstances may allow the simultaneous operation of RPAs while missions are active. In these cases the RPA will remain over or south of US-62 in the R-5601E airspace.

2.7. Noise Abatement Restrictions. Aircrews using IR-105 / VR-104 / VR-1137 will avoid the town of Cooperton at N3452.0 W9852.0.

2.7.1. The Wichita Mountains Wildlife Refuge is located 3NM north of the impact area. Do not overfly the refuge below 3000 feet AGL / 5500 feet MSL.

2.7.2. Do not overfly the Job Corps Center (3NM northwest of the target complex at N3442.0 W9844.3) below 3000 feet MSL within 1 mile.

2.7.3. Do not overfly the towns of lndiahoma or Cache below 3000 feet MSL.

2.7.4. Do not overfly at low altitude the two small farms 4.2 miles WNW of T-1, one mile west of Job Corps Road, at N 34 40.7 W 98 46.4.

2.8. Communications. Falcon Range has UHF, VHF, LMR, and telephonic communications equipment.

2.8.1. UHF. Falcon Range primary UHF frequency is 363.7; the secondary UHF frequency is 342.3. Additionally, a tertiary backup of 238.8 may be used with prior coordination.

2.8.2. VHF: Falcon Range has the capability to communicate / control utilizing VHF-AM frequency 141.85 (P) or 140.9 (S).

2.8.3. LMR: Falcon Range utilizes a variety of Land Mobile Radios (LMR) for internal communication requirements and to support weapons scoring, moving target, laser designation, and visual and electronic threat simulators.

2.8.4. DSN, commercial, and field communications are available at Falcon Range.

2.8.5. Frequencies and telephone numbers are listed in **Table 2.1, Falcon Range Telephone List and Table 2.2, Falcon Range Frequency Table.**

2.8.6. The flight lead will check in with Falcon Range prior to entering the range airspace. The RCO will then approve the flight onto the range or issue holding instructions and provide target information, as well as the current altimeter setting. After flight read-back, the RCO will relay the winds, weather of significance, and bird activity, as well as any restrictions and personnel locations, if applicable.

2.8.7. The Falcon Range public web site is at **http://sill-www.army.mil/falcon/index.html** . It contains target photos, scheduling contacts, range NOTAMs, and links to other related sites, including limited-access sites.

Table 2.1. Falcon Range Telephone List

Falcon Range	DSN 639-2043 / 6300 / 5862
Falcon Range	COMM (580) 442-XXXX
Falcon Range FAX	X-7421
Falcon Range (Cache)	COMM (580) 429-8344
Falcon Range (Mobile)	COMM (580) 483-4829
OLA, 3rd Weather Squadron	DSN 639-4000
Fort Sill	DSN 639-XXXX
Fort Sill	COMM (580) 442-XXXX
- Airfield Operations	X-5808 / 6160
- Henry Post (AAF) Tower	X-6748 / 4004
- EOD	X-8888 / 2313
- Fire Dept	X-3255 / 4905
- Military Police	X-2101 / 2102
- Range Control	X-2008 / 2994 / 6191
- Army Radar Approach Control (ARAC)	X-2004 / 2387
- 138th FW Det 1	X-2186 /2189 /3897 /2193
301 FW/CP, NAS JRB Fort Worth	DSN 739-6888/90/92
301 FW/CP	COMM (817) 782-6888
457FS /DOW	DSN 739-3069 x 701
457FS /DOW FAX	DSN 739-3169

Table 2.2. Falcon Range Frequency Table

Falcon Range Primary / Secondary / Tertiary	363.7 / 342.3 / 238.8
Falcon Range VHF Primary / Secondary	141.85 / 140.9
Close Air Support Control	356.5 / 344.5
Altus AFB Approach	257.725 / 125.1
Fort Sill (Henry Post) Approach	322.4 / 120.55
Henry Post AAF (Fort Sill) Tower	229.4 / 124.95
Lawton – Fort Sill Regional Tower	257.8 / 119.9
Fort Worth Center – North (includes Washita MOA)	269.375 / 128.4
Fort Worth Center – South	350.35 / 126.45
Sheppard Area Monitor (MOAs)	236.825 / 124.85

2.9. Night Vision Device (NVD) and Night Operations. Falcon Range has full night capability. This includes NVD and target marking capability (both IR and visible light).

2.9.1. Range personnel have a variety of night vision devices (Generation III NVGs) and IR pointers. IR Pointers will be employed from the main and flank towers. If aircrews do not wish to use this service, they should coordinate it in advance, as it will be provided to all night missions.

2.9.1.1. The 301st FW Life Support (301OSF/OSL) function provides service and periodic maintenance of NVGs used on-range.

2.9.2. Towers are marked with red obstruction lights for night identification, an infrared (covert) letter “M” oriented so as to appear correctly from west-to-east on the EW building north of the main tower, and an infrared (covert) letter “F” on top of the flank tower. When manned, the towers will also display an infrared strobe light. To preclude NVD washout and halo effects the red obstruction lights will be turned off unless the aircrews request otherwise.

2.9.3. Standard target lighting is depicted in Attachment 6. Nearly any target can be lighted at the aircrew’s request with at least two hours’ prior coordination to allow setup. Targets can be illuminated with both covert (IR/NVD only) or overt (unaided eye) lighting that is radio-controlled from the main tower. However, not all targets have good radio line-of-sight from the towers and some are in inaccessible areas. Contact Falcon Range for capabilities.

2.9.4. Range personnel will ensure cultural lighting around the operations area and the maintenance area is reduced or eliminated. This includes turning off outside lights, weather station obstruction lights, windsock lighting, and any other lights that may cause distraction. The lighting on the weapons residue storage area 450 meters east of the main tower will remain on during night operations.

2.9.5. There is some cultural lighting interference from the sparsely-populated housing areas and US Highway 62 to the south, from the city of Lawton to the east, and from the Job Corps located adjacent to the northwest corner of the range complex.

2.10. Helicopter Operations. Helicopters may use the lighted helipad located 245 meters/800 feet NW of the main tower. The helipad is a square concrete slab 50'x50' (15m x 15m). The helipad has standard "H" markings, and is reinforced and stressed to support aircraft up to 40,000 lbs.

2.10.1. Eight lights provide night identification of the helipad. The lights are normally off, and aircrews may request the lights to be turned on with prior coordination. If in contact with the RCO, allow approximately five minutes for the lights to be turned on. Similar coordination is required for the lights to be turned off. The helipad lights are not NVD-compatible.

2.10.2. A lighted windsock is located 110 meters/360 feet to the southeast of the helipad. Windsock lighting requires the same coordination as the helipad edge lighting. The windsock is on a photocell and is normally on after dark, except during scheduled night range missions, when it is turned off to preclude NVD interference.

2.11. Area Overflight. Do not enter or overfly R-5601C/D/E/F without approval from the controlling agency. Contact the RCO on 363.7 for entry approval or Fort Sill Approach Control on 322.4 for clearance to over-fly the restricted airspace.

2.12. Weather Requirements.

2.12.1. Day weather requirements. Range weather will be at least 1500 feet AGL / 3 NM for level deliveries; 2000 feet AGL / 3 NM for climbing and diving deliveries; or 500 feet above the highest portion of the pattern to be flown.

2.12.2. Night weather minimums are 3000 / 5 NM.

2.12.3. Pilots will discontinue events and advise the RCO whenever weather prevents positive range or target identification throughout the pattern. Falcon Range Operations will also advise the users at Sheppard AFB and NAS JRB Fort Worth, as well as any other scheduled users, when surface winds on Falcon Range exceed 35 knots. Range winds are available from Falcon Range on request. Range operations will be suspended any time the RCO determines a hazard exists due to excessive winds. The strafe targets may be lowered if the winds are excessive in order to prevent wind damage and prolong their use.

2.13. Range Entry, Holding, and Departure.

2.13.1. Range Entry. Flights may enter Falcon Range under IFR or VFR. If not entering the range via the IR/VR route structure, file to the SPS (CH 74) 338º/040NM. Prior telephone coordination with the RCO (DSN 639-6300/2043) is encouraged to reduce the number of radio transmissions. See Attachment 2, Aeronautical Chart, for information concerning Falcon Range environs.

2.13.1.1. VFR Entry. VFR entries may be made from any direction except east. Squawk Mode 3 4000 entering the range. Use caution for the Sheppard 1 and Washita MOAs (at or above 8000 feet MSL).

2.13.1.2. IFR Entry. When approaching the range under IFR, use Altus (257.725), Sheppard (269.025), or Fort Sill (322.4) Approach Control services. Contact the RCO upon canceling IFR. Squawk Mode 3 4000 entering the range.

2.13.1.3. Military Training Route (MTR) Entry. Flights may enter Falcon Range via any of the numerous IR and VR routes that terminate near R-5601. Contact Falcon Range 2-5 minutes prior to entry. Enter the range from the northwest, west, or southwest for first-pass tactical deliveries.

2.13.2. Holding.

2.13.2.1. IMC Holding. Hold as directed by the controlling agency.

2.13.2.2. VMC Holding. There are no designated VFR holding areas. Hold outside restricted airspace southwest or northwest of the range. If required, contact Altus Approach 257.725 to avoid the Altus AFB Class C airspace. Avoid continuous overflight of inhabited areas at low altitude during extended holding.

2.13.2.3. Altitude separation. The RCO may allow altitude stacks when coordinated between flight leads and the tactics or events allow one flight to hold over another.

2.13.3. Range Departures.

2.13.3.1. VFR Departure. Remain VMC. Do not exit the range to the east.

2.13.3.2. North Departures. Climb above 5500 feet MSL, but remain below the Washita MOA lower limit of 8000 feet MSL until in contact with Fort Worth Center (269.375).

2.13.3.3. South Departures. Low altitude: remain below the floor of the Sheppard 1 MOA (8000 feet MSL). Medium altitude: climb to 14,500 feet MSL and contact Sheppard Area Monitor (236.825 or 124.85) prior to departing range airspace. Use caution while transiting the Sheppard MOAs / student training areas.

2.13.3.4. West Departures. Avoid the Altus Class C airspace, contact Altus Approach 257.725.

2.13.3.5. IFR Departure. Exit R-5601 VMC if possible. If unable to remain VMC, remain within R-5601 until receiving an IFR clearance either from Fort Sill, Sheppard AFB or Altus AFB Approach Controls or Fort Worth Center.

2.13.3.6. The Falcon RCO will coordinate IFR departures with Fort Sill Approach upon request.

2.14. Authorized Ordnance.

2.14.1. Training ordnance (practice sub-scale and full-scale inert heavyweight bombs up to 2000 lbs; 20/25/30MM TP/TPT) is authorized for both day and night operations.

2.14.2. Full-scale inert heavyweight ordnance (inert MK-82, 83, 84) operations are approved but must be coordinated with the RCO prior to delivery to coordinate and confirm target selection. Targets T-2, T-8, T-12 and T-20 through T-24 are the Falcon Range heavyweight targets. Final attack heading restrictions are listed in Attachment 9, and are derived from the joint WDZ Tool. The restrictions in Attachment 9 are based on most aircraft and deliveries, but are not all-inclusive. Aircrews will not be allowed to employ heavyweight inert weapons without contacting Falcon Range before their scheduled range time.

2.14.3. Rockets may be employed on all authorized targets except T-25. White Phosphorous (WP) rockets may only be employed against T-1, T-2, T-6, T-8, T-9, T-12 and T-17.

2.14.4. Aircraft-dispensed self-protection flares may be employed above 1000 feet AGL (2400 feet MSL). LUU-2, -4, and -19 illumination flares may be employed above 4500 feet AGL (with a 500 foot delay) but extreme caution must be used to ensure the flares land on the range. Higher delays will require higher minimum altitudes.

2.14.5. Training chaff is authorized in accordance with AFI 11-214. Prior coordination with Falcon Range is required. No combat chaff may be expended on Falcon Range at any time.

2.14.6. Live ordnance is not authorized.

2.15. Weapons Danger Zones. Weapons Danger Zones on Falcon Range are plotted for user aircraft and are maintained by the ROO and in the control tower. The majority of approved weapons delivery events is depicted in Attachment 9 and shows the most common aircraft and delivery combinations at Falcon Range. Other events may be performed at the discretion of the RCO after a weapons danger zone risk analysis has been performed.

2.15.1. Certain ordnance and delivery parameters combinations may present a risk to areas outside the impact area. These munitions may still be employed but require coordination to ensure the adjacent training areas are clear of ground personnel. Munitions affected include low- and high-drag full-scale inert ordnance employed from low-angle, low-altitude parameters, LGTR and GBU deliveries. The events affected are listed in Attachment 9 (see notes). Contact Falcon Range to verify approved target/parameter pairings.

2.15.1.1. Training areas can be cleared in advance through Falcon Range scheduling up to 68 days in advance through the RFMSS scheduling program. However, Army ground training may still take priority.

2.15.1.2. If the training areas are occupied by ground personnel and equipment then the weapons deliveries may be restricted to specific targets, the parameters may be modified, or the events may be prohibited.

2.15.1.3. There are three surveyed Observation Points (OPs) within the impact area which may be used for close air support control. If the risk exceeds authorized values approved by AR 385-63 (1:1 million) then the OP must either be vacated for the events, or the events are prohibited.

2.16. Minimums/Fouls. Delivery events and parameters, scoring criteria, spacing, fouls, foul penalties, and restrictions are IAW AFI 11-214 and aircraft-specific operational guidance.

2.17. Range Procedures.

2.17.1. Radio Procedures. Upon initial radio contact, pass any changes to prior coordinated data. If the mission was not coordinated prior to arrival, pass delivery events and desired targets.

2.17.2. Basic (Conventional Box) Pattern. The basic pattern, day or night, is a rectangular pattern situated north of the target areas. Use left traffic for an east (080º magnetic) run-in and right traffic for a west (260º magnetic) run-in. Refer to Attachment 9, Falcon Range Attack Axis Matrix.

2.17.3. Tactical Delivery Pattern. The final tactical attack heading, day or night, varies with the selected target area, delivery parameters, and weapon. Refer to Attachment 9, Falcon Range Attack Axis Matrix.

2.17.3.1. Fly the pop-up pattern from the western quadrant only. The final attack heading is generally west-to-east, with further restrictions and refinements to run-ins based on the ordnance being delivered. Recover with a left turn off-target to north, or if to the south to remain within R-5601E.

2.17.4. High Angle Strafe Pattern. The tactical targets' HAS final attack heading is generally 035°-125° or 215°-305° magnetic and may be flown from a basic or tactical pattern. Scored HAS is on a 080° ± 10° heading (Target 3).

Chapter 3

ABNORMAL PROCEDURES

3.1. Armament System Malfunctions/Unintentional Release.

3.1.1. Aircrews will ensure that their systems are safe any time the aircraft is outside the restricted area. Additionally, aircraft will be armed only when consistent with service and command directives, regulations or instructions to ensure munitions remain within the impact area only.

3.1.2. Armament Systems Malfunctions. System malfunctions will be handled IAW applicable command, aircraft, and unit operating procedures.

3.1.2.1. Inadvertent Releases (ordnance fired or released without pilot consent). Check armament switches safe and do not attempt further release in any mode. Immediately report inadvertent releases to the RCO.

3.1.2.2. Unintentional Releases (ordnance fired or released as a result of pilot error). Check armament switches safe and do not attempt further release in any mode until the determination is made that the release was unintentional and not inadvertent. The decision to continue to allow releases is solely the RCO's and will not be arbitrated.

3.1.2.3. Hung Ordnance. Prior to departing the range, safe all armament switches and recover IAW applicable command, aircraft, and unit regulations. Avoid populated areas while departing the range.

3.1.2.4. Off-Range Release. Report any release, whether inadvertent or unintentional, which results in or is suspected to result in an impact outside the impact area to the RCO. Refer to Attachment 3, Restricted Area R-5601 Map, for impact area boundaries. The RCO will report the release to Range Control.

3.2. External Stores Jettison. For controlled jettison of external stores, including fuel tanks, suspension equipment, and practice ordnance, jettison on a 080° magnetic heading at an airspeed and altitude consistent with safe operation so that impact occurs near the Conventional Bomb Circle (T-1). Live munitions will not be jettisoned at Falcon Range unless an extreme emergency exists. Coordinate with the RCO for jettison of live munitions at Fort Sill (R-5601B).

3.3. Emergency/Abnormal Operating Procedures.

3.3.1. Controlled Bailout. The aircraft should be flown on a 045º heading at 2000' AGL (3500' MSL) between the flank tower and the west end of the runway. This ensures the aircraft crashes on U.S. Government property while minimizing risk to ground personnel. It also keeps the pilot(s) away from hazardous dud areas. If possible, coordinate with the RCO prior to bailout in order to allow any personnel on-range to clear the area.

3.3.2. Forced Landing. If an aircraft must make a forced landing within the impact area, aircrews must remain with the aircraft until range personnel can perform recovery operations, unless there is a risk of fire or explosion at the downed aircraft site. This is due to the high risk of unexploded ordnance in the area. If possible, establish radio contact with the RCO.

3.3.3. Radio/Electrical Failure. Two-way radio communication with Falcon Range is required to expend ordnance on the range. In the event of radio failure on UHF primary

363.7, attempt contact on UHF secondary 342.3, UHF 243.0, and finally VHF 141.85. Depart the range if contact with the RCO is not reestablished.

3.3.4. Emergency Airfields: Check current FLIP documents and NOTAMS for the current status of facilities at emergency airfields. The airfields depicted in **Table 3.1, Emergency Divert Airfields**, have a usable runway length greater than 7000 feet and are listed in order of proximity to the range; Henry Post AAF is the closest available runway but is only 5000' in length with no arresting gear.

Table 3.1, Emergency Divert Airfields

AIRFIELD	ICAO	LAT LONG	ELEV	TACAN	RWY& LNGTH	TWR	CABLE	BRG RNG
LAWTON REGIONAL	KLAW	N 3434.1 W 9825.0	1110	31 (VOR)	17/35 (8600')	257.8	NONE	116º 17 NM
ALTUS AFB	KLTS	N 3439.5 W 9916.0	1382	35	17/35 (13,400')	255.6	NONE	264º 28 NM
SHEPPARD AFB	KSPS	N 3359.1 W 9829.5	1019	45	15/33 (13,100')	279.525	MA1A	165º 40 NM
CLINTON-SHERMAN	KCSM	N 3520.4 W 9912.0	1920	37	17/35 (13,500')	256.9	NONE	323º 55 NM
WILL ROGERS	KOKC	N 3523.6 W 9736.0	1295	88	17/35 (9800')	269.45	NONE	044º 70 NM
TINKER AFB	KTIK	N 3525.1 W 9723.4	1291	105	17/35 (11,100')	289.6	BAK-12	047º 80 NM
HENRY POST AAF	KFSI	N 3439.0 W 9824.1	1189	31 (VOR)	17/35 (5000')	229.4	NONE	087° 15 NM

Chapter 4

RCO PROCEDURES

4.1. RCO Procedures. RCO responsibilities and performance standards are outlined in core personnel documents on file at Falcon Range.

4.1.1. The RCO will ensure that the airspace is opened prior to the start of the first range period. Fort Sill Range Control will provide the opening check-in codes and the pyro status. Fort Sill will also verify the Officer-In-Charge during check-in.

4.1.2. For hot range missions (actual ordnance and/or combat lasers) the RCO will ensure all personnel are out of the hazard area 15 minutes prior to the scheduled range time. This includes the use of roll-calls if verification is uncertain. The RCO will be in position NLT 20 minutes prior to the scheduled start of the range time. The RCO will also ensure all required positions are manned NLT 15 minutes prior to the scheduled start of the range time.

4.1.3. The RCO will ensure the Range Safety Pennant (Red Flag) is flying from the flagpole during times the airspace is active. The pennant will be lowered when the range ground and air spaces have been closed with Fort Sill.

4.1.4. Before the first missions the RCO will verify operation of all radios, the hot line to Fort Sill Approach Control, and the digital voice recorder. The RCO will also verify that a range check has been accomplished, that all personnel including visitors are accounted for, and the targets are of suitable condition.

4.1.5. At the conclusion of flying the RCO will verify that the airspace has been closed with Fort Sill Range Control.

4.1.5.1. The checkout with Fort Sill includes number and type of aircraft on-range, personnel, ordnance number and type to include DODIC codes, and any special comments. Fort Sill will provide checkout codes.

4.1.5.2. During scheduled extended periods of inactivity when the airspace is activated, the RCO should contact Fort Sill Approach Control in order to allow controlled through-flights of the range airspace by other aircraft.

4.2. RCO Training. The ROA is responsible for the training of new RCOs. The ROO will maintain currency tracking and perform RCO quality control functions.

4.2.1. Written Examination. The ROA will administer a written, open-book examination on applicable instructions, regulations, topics and issues. The exam will be prepared by the Range Training Office. Passing score is 85 percent. The exam will consist of 35 randomly selected multiple choice questions. The testing RCO is immediately decertified if the written examination is failed. If the RCO fails a second time, the RCO must re-accomplish the entire RCO training program. If the RCO fails a third time, the RCO will be dismissed from performing RCO duties.

4.2.2. On-Range Demonstration consists of day and night qualification. Day qualification is a prerequisite to night qualification. The RCO trainee will observe one mission before controlling the same type of mission. Mission types are basic surface attack (BSA), surface attack tactics (SAT) and close air support (CAS).

4.2.2.1. Day. Each upgrading RCO will observe a qualified RCO demonstrate proper methods and techniques for controlling aircraft during air-to-ground operations. After observing at least four flights conducting range operations, the upgrading RCO will control at least four flights (at least two 4-ships, if 4-ship flights frequently use the range) under the supervision of a qualified RCO.

4.2.2.2. Night. Each upgrading RCO must observe at least one night flight and control at least one night flight of both BSA/SAT and CAS missions under the supervision of a qualified RCO.

4.2.2.3. The ROA will maintain documentation of the training. The training folders will contain the certification letter signed by the OG/CC, training checklists, and individual mission grade sheets and training plan, as well as other certificates and supporting documentation.

4.3. Ordnance Delivery Clearance. There are no provisions for releasing ordnance on Falcon Range without radio contact with the Range Control Officer, i.e. Class B/C operations. The RCO may hand off final authority to other agencies IAW AFI 11-214, *Air Operations Rules and Procedures* and JP 3-09.3. The RCO retains abort authority at all times.

4.4. Range Safety and Security.

4.4.1. Safety. The RCO may not have a clear view of each possible attack axis or delivery event. Current generation fighter aircraft, employing high altitude tactics, may be difficult to acquire visually. Pilots must positively identify targets prior to expending ordnance.

4.4.2. Do not point at or overfly manned sites during weapons delivery passes.

4.4.3. Heavyweight inert munitions delivered at shallow dive angles travel beyond the target as far as 3000 meters after breaching. Some may change direction by as much as 30 degrees from the delivery heading. Pilots must adhere to run-in restrictions when employing heavyweight munitions, especially when using shallow delivery angles. Refer to Attachment 9 for attack axis graphic displays.

4.4.4. Security. Shared-use policies contribute to occasional unauthorized range entry. The RCO will request a clearing pass whenever there is any doubt as to range security. Refer to paragraph 2.15 for further information.

4.5. Visitor Procedures.

4.5.1. All visitors to the range, whether directly involved in operations (e.g. JTACs), supporting operations (e.g. UXO demilitarization) or observation will sign the visitor log and receive a safety briefing before proceeding down-range. Visitors to the range operations complex only will sign the log but are exempt from the range safety briefing. This safety briefing is valid for six months. Fort Sill-assigned range personnel and 301st FW RCOs are exempt from this paragraph.

4.5.2. In accordance with AFI 13-212 and Army Regulation (AR) 385-63, *Range Safety*, visitors not involved in the conduct of training operations will remain clear of the Hazard Area during weapons deliveries. Range personnel will provide escort or surveillance of visitors at all times, except for pre-briefed JTACs when performing mission-related duties, Fort Sill-assigned range personnel, and on-site subcontractors who have been briefed on their authorized locations. The RCO will verify that ordnance delivery patterns will not present

any hazard to visitors/spectators. The Footprint Book must show better than one in one million risk analysis for the location of visitors. Restrict deliveries if required (change targets, assign run-in restrictions). If operations must be conducted which subject the visitors to greater than a one in one million risk of weapons effects, then the visitors will be relocated to the range pennant at the south boundary road in accordance with AR 385-63.

4.5.2.1. Time-critical or cost-prohibitive operations such as the installation or repair of infrastructure by outside agencies [contractors, vendors, engineers, etc] or deliveries of materiel may take precedence and require coordination with the aircrews to ensure safety. UXO destruction and relocation at the East Residue Area cannot be placed on hold due to time and funding constraints and may require the denial of certain delivery patterns or tactical events.

4.5.2.2. JTACs may conduct missions within the Hazard Area in accordance with AFI 11-214, AFI 13-212 and with the concurrence of Range Control. JTACs must be properly equipped in accordance with AFI 13-112V1, *Joint Terminal Attack Controller (JTAC) Training Program*, while inside the Hazard Area.

4.5.2.3. Refer to Attachment 7, Manned Sites and OAPs, for a description of observation points and offset aim points.

4.5.3. The normal location for visitors to observe range operations is the main tower. Visitors will be briefed on the risk factors of range operations. Visitors who are not comfortable with the risk will be relocated to the range pennant at the south boundary road.

4.6. Bird Conditions. Southwest Oklahoma lies within a migratory flyway for numerous bird species. These range from small birds to raptors and large waterfowl. The most active time for migratory bird activity is fall and early spring. The range includes habitats suitable for large raptors such as hawks and vultures. These birds may be active at any time of the year. Vultures in particular pose a threat to low-level aircraft since they may congregate in groups at altitudes as high as 2000' AGL.

4.6.1. The RCO will report both the forecasted bird condition as reported by US AHAS and actual visual sightings or non-sightings during initial check-in and during the range operations.

4.7. Restricted Operations.

4.7.1. A "check-fire" ordered by Fort Sill Range Control curtails all activities on Falcon Range. The RCO will direct aircraft to hold "high and dry" until Fort Sill Range Control allows further activity on Falcon Range.

4.7.1.1. The RCO may allow dry operations with restrictions if allowed by the Fort Sill Fire Department during wildland firefighting operations. The Fire Chief has final authority over the range ground and air space.

4.7.2. The Falcon Range RCO may restrict, suspend or curtail operations as required to ensure the safety of all personnel.

Chapter 5

LASER OPERATIONS AND INERTIALLY-AIDED MUNITIONS

5.1. Coordination. Laser operations require prior coordination to allow public notification and security on the range. Cancellations should be made as soon as possible to preclude unnecessary activation of specialized range control procedures. Contact Falcon Range Control Officer at DSN 639-6300 for approval of laser operations.

5.2. Approved Laser Systems. Falcon Range is certified by AFRL 711 HPW/RHDO for the safe use of most DOD fielded fixed-wing, rotary-wing and man-portable laser systems. The most recent AFRL 711 HPW/RHDO Optical Radiation Safety Consultative Letter, Falcon Range Laser Safety Survey, is maintained at Falcon Range and at 301OG/CC, NAS Fort Worth JRB, TX 76127-6200. Contact the Falcon Range Control Officer for approval of laser operations and suitable laser, OP and target combinations, which are published in the Consultative Letter. Tank-mounted systems were not evaluated and are not approved for use.

5.3. Laser Operations. Users requesting laser employment will contact the range prior to employment. This allows the range to be completely cleared and for ground personnel to don protective equipment. Short-notice requests may take up to 10 minutes to ensure all personnel are clear of the Laser Surface Danger Zone (LSDZ) and have protective equipment.

5.3.1. General. Ground personnel will wear approved laser eye protection which covers the laser wavelength with an optical density suitable for the laser employed. The RCO will announce before any laser activity the need to wear LEP before commencing laser operations. All personnel will leave the impact area unless actively involved in laser activity (i.e. JTACs performing laser operations).

5.3.1.1. The RCO will not allow any lasers until complete accountability is established for all personnel. On-site personnel will check in with the RCO with their location and LEP status before the RCO allows laser activity.

5.3.1.2. Ground-based laser designators and range-finders will not be fired above the horizon. Low-power markers may be fired above the horizon if approved by the Consultative Letter. The Green Beam Designator will not be used on Falcon Range.

5.3.1.3. Ground-based systems will not be fired against any target or on any azimuth that allows the escape of laser energy from the range boundaries at an unsafe power level. Since this cannot normally be determined without extensive research and simulation, only the approved firing point/target combinations will be used. Under no circumstances will ground-based designators be fired on any azimuth except toward the north due to the proximity of populated areas and OK Highway 115.

5.3.2. Aircraft Mounted Laser Systems. All authorized fixed-wing lasers may be employed from any direction, anywhere within the confines of restricted airspace, and on any target except for T-11 and T-18, or other targets as directed by the RCO. The minimum safe lasing altitude varies with the type of laser system employed and the distance of the designator aircraft from the target. Refer to **Table 5.1, Airborne Laser Flight Profile Limitations.**

Table 5.1, Airborne Laser Flight Profile Limitations.

Ground Range to Target (NM)	Minimum Altitude (Feet AGL)	Minimum Altitude (Feet MSL)	Ground Range to Target (NM)	Minimum Altitude (Feet AGL)	Minimum Altitude (Feet MSL)
0.5	150	1550	6	2000	3400
1	300	1700	7	2400	3800
2	600	2000	8	2900	4300
3	900	2300	9	3400	4800
4	1300	2700	10	3800	5200
5	1750	3050	15	6100	7500

Note: This table utilizes a 5 mrad buffer angle, high-power designator and a baseline 1400 feet MSL target.

5.3.2.1. A depression angle of a minimum of 5° ensures that the LSDZ does not exceed allowable limits. The absolute minimum angle for airborne laser designation is 3° unless cleared following evaluation with the Laser Range Management Software. Lasing will not be performed below 2000 feet AGL while crossing public highways or over-flight of housing areas, and will not be performed below 3000 feet AGL / 5500 feet MSL over the Wichita Mountains Wildlife Refuge.

5.3.2. Man-Portable Laser Systems. Most DOD man-portable laser systems are approved for use at Falcon Range. There are several target and firing position combinations available. However, not all targets are accessible from all firing positions, and delivery restrictions further limit employment flexibility.

5.3.3.1. Falcon Range has a Ground Laser Target Designator (GLTD) which can be used to designate certain targets for laser-spot search tactics. Normally in the main tower, it can be fired from the flank tower as well. Contact the range at least 3 hours in advance to coordinate its use.

5.3.3.2. GLTD Employment. The range must be cleared prior to GLTD operations; no personnel are permitted inside the impact area during its operation. The operator of the GLTD will install the GLTD and SEE-SPOT combination on the camera pan-and-tilt device, and control the targeting from inside the tower. The operator will test its balance and make corrections before connecting the power supply. The RCO will make a “laser hot” radio call, and direct all personnel to wear LEP. Only then may the operator open the apertures (remove the protective covers) from the GLTD. After the SEE-SPOT is ready for use, ensure the GLTD and SEE-SPOT are boresighted, and make corrections. The operator then will test fire against T-4 to ensure boresight. At no time must the GLTD fire above the horizon. Only approved targets may be engaged, refer to the AFRL 711 HPW/RHDO Optical Radiation Safety Consultative Letter. When not firing, ensure the protective covers are reinstalled.

5.3.3.3. Verify the PRF code with any sensor(s) before firing the GLTD.

5.3.3.4. After firing is completed, disable the GLTD by disconnecting the power first, and then disconnect the pan-and-tilt controls.

5.3.3.5. Falcon Range possesses two Infrared Zoom Laser Illuminator Designators (IZLIDs) and one GCP-1A Ground Commander's Pointer. These and any other markers will only be employed with the operator wearing both NVGs and LEP. Use extreme caution when firing an IZLID from the tower; ensure that the tower catwalk rails are not in the way of firing. From the main and flank tower, operators will use the turret with the IZLIDs.

5.3.3.5.1. Operators of the IZLID and GCP will keep the aperture covers on unless firing. As soon as the firing is completed, replace the cover. For the IZLID, ensure the key is installed before firing, otherwise the unit will not designate. Remove the key before transport after firing.

5.3.3.5.2. The IZLIDs and GCP are stored in the GSA safe. When taking a laser marker out of the safe, sign it out and indicate the time of return when finished. Spare batteries are kept in the tower. Only test the IZLID or GCP from the tower or OP, and always ensure the area downrange is safe. Treat any laser as a loaded weapon.

5.3.4. Approved Ordnance. Only inert GBU-10/12/16 and Laser Guided Training Rounds (LGTRs) may be employed at Falcon Range. No live munitions or any form of GBU-24, GBU-27 or GBU-28 may be employed at Falcon Range.

5.3.4.1. Restrictions. The WDZ for GBU-10/12/16 Laser Guided Bombs restricts delivery flexibility. Parameters and targets are restricted in both dive angle and attack heading. Off-range or out-of-impact-area impacts are a possibility unless the final attack restrictions are followed absolutely. Contact the Falcon Range RCO for weather back-up options. The restrictions for LGTRs and approved GBUs are listed in Attachment 9.

5.3.5. Logging laser use. The RCO will document the laser use with the range laser log. This log will be compiled and maintained on the shared drive, and is reported to both AFRC and Fort Sill Range Control annually. The log includes the number and type of aircraft, if any, as well as the type of laser, the targets engaged, the RCO and LSO, and the times on and off. It is maintained for a minimum of 5 years.

5.4. Laser Safety. The RCO will terminate all laser operations if unauthorized personnel are observed in the LSDZ, in the event of equipment malfunction, or anytime laser safety cannot be assured. Pilots must cease active laser operations anytime the intended target is lost from the field of view. Any laser incidents will be promptly reported in accordance with the 711th HPW reporting protocols. A copy of the incident checklist is kept in the RCO Quick Reference Checklist.

5.5. Laser Scoring. Four laser scoring systems are available. All four systems require prior notice for set-up.

5.5.1. The Large Scale Target Sensor System (LSTSS) is located in the LTA and consists of a down-range power supply and communications node, a 30-foot tower, and two sensors. The downrange transmitter is part of the communications node, and communicates with the operator's scoring station. The LSTSS is a static system, which can score a number of designated targets on specific laser-to-target lines (LTL). Not all targets and/or DPIs in the

LTA can be scored, and the sensors can only score the side(s) of the target facing the sensors. Some DPIs are within the field of view of more than one sensor, but with a different sensor-to-target axis. Refer to Attachment 10 for LTA DPIs and laser scoring capabilities.

5.5.1.1. Aircrews requesting use of the LSTSS should contact Falcon Range prior to the mission to ensure the system is operating and to allow the operator time to initiate the scoring sequence. On-range, the aircrews will provide the PRF (laser code) to the RCO to ensure the sensors acquire the correct laser spot. Aircrews will also provide the specific DPI and expected LTL to allow the LSTSS operator to assign the correct sensor to the target array and score the correct DPI. If the actual DPI name is not known, describe the target in relation to other targets (e.g. "third small building from the south in a north-south row") to allow the proper scoring setup.

5.5.1.2. The LSTSS captures laser energy and graphically depicts the centroid of the laser spot to the operator, who can provide a score in feet and clock position based on the (LTL). If the laser energy is not visible to the sensor no score will be provided. This may be a result of lasing a vertical target on a side away from the sensor.

5.5.2. The range has a Laser Spot Visual Recorder System (LSVRS) which uses a pair of cameras to score laser energy during day or night operations. The system visually displays laser energy as it hits a target within the cameras' field of view as a light spot, and can be slewed to different targets. The aircrew only needs to a fire combat laser (1064 nm) at the desired target. Aircrews will also provide the specific DPI and expected LTL to allow the LSTSS operator to score the correct DPI. If the actual DPI name is not known, describe the target in relation to other targets (e.g. "third small building from the west in a east-west row") to allow the proper scoring setup. Horizontal targets cannot be scored. If the laser energy is not within the camera field of view, it cannot be scored. Additionally, the operator may reduce the scoring volume to preclude interference from affecting the score. If the spot is inside the field of view but not the scoring volume on the target, the spot will be visible but no score will be displayed. The LSVRS can, at aircrew request, transmit a tone over the range frequency if the laser energy is within the designated scoring volume. The tone can also be disabled if requested.

5.5.2.1. Aircrews may request a copy of the displayed data, usually in an MPEG or AVI format. Contact the range before flight to coordinate an electronic or CD/DVD copy.

5.5.3. Both the LSTSS and LSVRS require aircrews to designate on specific targets within the LTA. The targets are approximately 1 meter square with a black outline around a white square. The targets face their respective sensor and can only be scored on specific laser-to-target lines. Refer to Attachment 10 for details.

5.5.4. Falcon Range has a single Laser Evaluator System-Mobile (LES-M) that can be used to validate laser designation and ensure properly bore sighted targeting pods and laser designators. When a laser designator (combat) illuminates the LES-M, it transits a chopped tone over the range frequency. This gives aircrews immediate feedback regarding their laser systems. The tone is low-power and can be overridden by aircraft and RCO radios. The size of the footprint the laser produces is based on range and elevation from the laser to the target. At close range (inside of 1000 feet/300 meters slant range) side lobes may trigger the LES-M to transmit when the centroid of the laser spot is not exactly on the LES-M. For slant ranges of greater than 1000 feet the LES-M will not trigger unless the laser spot is centered within 3

feet (1 meter) of the LES-M. For the case where the designator is a long distance from the target (24,500 feet/7500 meters), the spot may be as large as 12 feet in diameter, depending on the designator. In this case, there is enough amplitude variation within the main beam that the box still scores accurately within the 3 foot radius.

5.5.4.1. The LES-M is mobile and can be placed on or near any targets. However, it makes that target a no-drop target with a 500-meter no-drop radius around the LES-M. For daily use it is located on a slightly raised platform within the LTA, but it may also be placed on no-drop targets or on a vehicle parked adjacent to a no-drop when requested. The LES-M can be placed in the bed of a tactical vehicle, which gives aircrews a tactical target to observe.

5.5.4.2. The RCO will provide the coordinates of the LES-M, or flight leads can call ahead and ask for a specific target as part of a scenario. The LES-M requires a power supply (small generator) so plan accordingly. It will not be placed on-range unless requested. LES-M setup outside the LTA requires a minimum of two hours advance notice.

5.5.5. Falcon Range possesses a SEE-SPOT III which is an IR camera system that integrates a laser seeker. This laser seeker allows the viewing of a combat laser spot (1064 nanometers) under most conditions, although night allows better IR contrast. The RCO can assess the aircraft's targeting pod accuracy with this system. The SEE-SPOT requires one hour for setup.

5.5.5.1. The SEE-SPOT is usually in the main tower but can be placed in other locations. Because it is a manual system the location is manned, so no munitions may be dropped near the SEE-SPOT. If a target cannot be viewed from the SEE-SPOT operator's location, it cannot be scored. Additionally, if the aircraft is illuminating a target with vertical development, then the operator may not be able to view the laser spot if it is on the side of the target that is obscured.

5.6. Inertially Aided Munitions (IAMs):

5.6.1. Inertially aided munitions include the GBU-31(V)1 and GBU-31(V)3, GBU-32, and GBU-38 Joint Direct Attack Munitions (J-DAM), the GBU-39 Small Diameter Bomb, and the CBU-103, CBU-104, and CBU-105 Wind-Corrected Munitions Dispensers (WCMD), and follow-on weapons such as the LJDAM and Dual-Mode Laser-Guided Bomb (DMLGB).

5.6.2. The WDZs for IAMs dictate restricted deliveries at most Class A ranges. Unrestricted simulated weapons deliveries (dry-only) are authorized where there is no chance of an actual release using aircraft-specific dry practice procedures. Aircrew will ensure that no actual munitions are selected.

5.6.3. Actual IAM employment is authorized with the following restrictions:

5.6.3.1. Ordnance. Inert GBU-31s, -36s, -38s -44s and -54s are the only authorized IAMs.

5.6.3.2. Targets. GBU-31s and GBU-44s are only authorized on Target T-2. GBU-36s, -38s and -54s are authorized on Targets T-2, T-12 and T-20.

5.6.3.3. Weapons Parameters. Aircrews will set a minimum impact angle of 65º for the weapon, and will attack the target with no more than 10º offset from a direct attack (i.e.

target displaced no more than 10º from the flight path of the aircraft) at release. Refer to T**able 5.2, J-DAM Weapons Parameters**, for airspeeds and release ranges.

Table 5.2. J-DAM Weapons Parameters

Release Airspeed (KTAS)	Release Range (NM)	Release Altitude (AGL)	Release Dive Angle (Degrees)
300 – 400	1.0 to 4.0	5000 - 10000	0 to -5
300 – 400	3.0 to 4.0	10000 – 15000	0 to -5
400 – 650	1.0 to 4.0	5000 - 10000	0 to -5
400 – 650	3.0 to 5.0	10000 – 15000	0 to -5

5.6.3.4. Airspace. Actual J-DAM deliveries are restricted to employment from over R-5601B on a weapons attack heading of 250º to 270º (260º ± 10º). This requires at least 24 hours' prior coordination to ensure separation from artillery in R-5601B. No attacks from the west are authorized due to the risk of an off-range impact outside of government property.

5.6.3.5. Weapon Delivery Modes. Weapons modes that utilize a preplanned coordinate as the target such as Continuously Computed Release Point (CCRP) and Bomb on Coordinate (BOC) modes are authorized. Reference aircraft specific procedures for limitations. Aircrew will pre-coordinate attacks and delivery modes with the RCO before takeoff.

5.6.4. Triple Check. Each aircraft will accomplish three independent safety checks (two person minimum) before releasing a J-DAM on Falcon Range. These checks must ensure accurate coordinates are loaded into the weapon memory prior to release.

5.6.4.1. The aircrew will verify their coordinates via telephone with the RCO during mission planning. (Check #1)

5.6.4.2. During taxi out, the aircrew will confirm with their SOF, SDO or Operations personnel the target coordinates as loaded into the aircraft with a read-back. (Check #2)

5.6.4.3. On range, radio confirmation of the weapon memory coordinates to the RCO or a JTAC is a required safety check for all aircraft. The aircrew read directly to the RCO or JTAC the coordinates for the weapon memory. (Check #3) Additional checks are aircraft specific.

5.6.4.4. If equipped, each aircraft will also verify that the aircraft system is properly targeted through the use of heads-up display symbology and/or targeting systems (targeting pods).

5.7. Directed-Energy Weapons. Directed-Energy Weapons will not be employed at Fort Sill and Falcon Range.

Chapter 6

THREAT SIMULATION

6.1. Resources. Falcon Range provides visual and electronic threat simulators support upon request, consistent with available resources. Call Falcon Range at DSN 639-6300 for assistance.

6.2. Visual Threat Simulators. Falcon Range possesses one four-shot Smokey SAM launcher, and two four-missile MANPAD simulators. The range also has one AAA simulator which presents a visual indication of a 57mm anti-aircraft battery. IED simulators may also be available; these simulators provide a visual indication of a ground explosion. The launchers are portable and may be located at a variety of locations on the range, depending upon user requirements. The ROA must approve employment of the visual threat simulators. Falcon Range will then employ the system as directed by the flight lead.

6.2.1. Coordination. The use of visual threat simulators requires prior coordination. All visual threat simulators are subject to availability restrictions; due to funding and storage requirements the simulators are not usually available without significant lead time.

6.2.2. Employment. Falcon Range personnel will employ visual threat simulators at the flight leader's discretion, from the location and at the distance and time requested so that the desired learning objective is obtained. If the flight lead does not brief a specific location, the RCO will designate a launch location consistent with the pyro status and clear of active targets.

6.2.3. Safety. Falcon Range personnel will establish a missile launch site that will ensure a minimum of 2000 feet of vertical and lateral clearance from the flight's anticipated ground track. If the RCO or missile launch personnel perceive that an aircraft might violate the 2000-foot clear zone, the launch effort will be aborted.

6.3. Electronic Threat Simulators. Falcon Range has three threat emitter systems for electronic warfare (EW) training. Two AN/UPQ-8(V) systems are available, one RWR-LITE and one RWT. These offer mid- and high-band threat simulations. Also, for HARM training, a HARM Target Emitter (HTE) is available. For further information about the capabilities of these EW simulators, call Falcon Range.

6.3.1. Coordination. The use of electronic simulators requires prior coordination. Schedule EW support at least one hour before employment, so range personnel can assemble and set up the simulator. Certain weather conditions, such as high winds and/or blowing dust, may require the RWR-LITE or RWT to be stowed.

6.3.2. Employment. Falcon Range personnel will employ EW at the flight leader's discretion, from the location and at the distance and time requested. Flight leaders should thoroughly brief the RCO so that desired effect is obtained. If the flight lead asks for the RCO's option, or does not indicate a specific location, then the flight members can expect a randomly chosen origin for the EW emissions. The HTE is in a fixed site near the operations center at Falcon Range.

6.3.3. Target acquisition. The threat emitters will be set up at locations outside the Falcon Range Impact Area. The RWR-LITE and RWT can be taken off-range and placed near low-level routes or within the adjoining MOAs. It is possible that the aircraft is acquired late or not at all due to terrain, aircraft altitude, weather, sun angle, or other tactical considerations.

The threat emitters do not actually acquire an airborne target and track it; rather, the operator places the optical sight on the target and illuminates the aircraft while holding the sight on the target. This requires visual acquisition and emitter slewing by the operators. The HTE is a static emitter only, and covers a lane for anti-radiation missile training.

6.3.4. Termination. Falcon Range personnel will cease all training EW emissions any time the aircrew transmits "TERMINATE" or "KNOCK-IT-OFF".

6.4. Electronic Countermeasures. The use of combat electronic jamming in R-5601 is prohibited. Training chaff is authorized in accordance with AFI 11-214. Prior coordination with Falcon Range is required. No combat chaff may be expended in R-5601 at any time.

Chapter 7

CLOSE AIR SUPPORT TRAINING

7.1. Close Air Support Training. Falcon Range supports Close Air Support (CAS) and Forward Air Controller/Joint Terminal Attack Controller (FAC/JTAC) training. Falcon Range personnel are not instructors, but do facilitate training and help ensure safety. **Note**: Do not confuse CAS training at Falcon Range and similar training with Army student controllers on Fort Sill's West Range. Refer to Fort Sill Regulation 385-1 for West Range information.

7.1.1. Facilities. To support CAS training, Falcon Range offers a combined briefing and training facility for TDY personnel. No overnight lodging facilities are available. Overnight operations within the adjacent training ranges (bivouac operations) require authorization and briefings from Fort Sill Range Control; Falcon Range cannot authorize overnight operations. There are two full bathrooms with shower facilities, a full kitchen, and a break area. The facility is available at no cost. Contact Falcon Range at DSN 639-6300 for details.

7.1.2. Scheduling. See paragraph 1.2, Scheduling, for general information. Falcon Range does not schedule fighter/attack resources for CAS missions, only the range airspace. Users must ensure there are no conflicts with West Range. Ground and air units that desire to conduct CAS training at Falcon Range must jointly coordinate their schedules with Falcon Range to avoid conflicts with other users.

7.1.3. Operations. Falcon Range will support CAS training at the requested level. Generally, the RCO will complete administrative actions (range clearance, special instructions, and restrictions) on the Falcon Range primary frequency, 363.7. If the JTAC requests a separate frequency, the RCO will then hand off the flight to the JTAC on Falcon Range secondary frequency, 342.3. This action separates administrative and combat training functions. If the target can be scored, the RCO will score each hot pass but will not transmit weapons scores unless requested. Scores will be forwarded to participating units by fax or email, as appropriate.

7.1.4. JTAC Locations. JTACs may use any of several locations to conduct their operations. These locations include either the Main or Flank Towers, and any location outside the impact area. JTACs may control weapons delivery sorties from within the impact area provided the following conditions are met:

7.1.4.1. The mission is dry (no ordnance, or if combat lasers are employed, the JTACs are located outside all laser hazard zones), or;

7.1.4.2. The Falcon Range RCO conducts a risk analysis using the weapons safety program and approves the proposed location, and;

7.1.4.3. The mission is conducted from the surveyed observation points.

7.1.4.4. The JTAC is no closer than 500 meters to the closest planned target.

7.1.4.5. The aircraft are employing only practice munitions.

7.1.4.6. The pilot has visually confirmed the JTAC location.

7.1.4.7. The pilot does not point at or overfly the JTAC location during roll-in, track or recovery.

7.1.4.8. If practical, an RCO-qualified member should accompany the JTAC. (Single RCO procedures, such as extended duty hours, may preclude this.)

7.1.5. Surveyed JTAC observation points will have a small metal building nearby, with orange and white markings on top in order to provide a readily identifiable location.

7.1.6. Safety. Pilots, JTACs, and the RCO share the responsibility for conducting CAS operations safely. When personnel occupy locations within the impact area, every weapons delivery pass presents ground personnel with potential hazards. The RCO and JTAC must continually assess the risk level of these operations. JTACs and RCOs will abort questionable weapons delivery passes, and will terminate CAS operations if and when any member's comfort level is exceeded.

7.1.6.1. The RCO generally has a better vantage point from which to view the aircraft, and has the ultimate responsibility for the safe conduct of the range operations. The RCO can abort for safety reasons any aircraft without the permission of the JTAC.

7.2. Fort Sill West Range. Fixed wing air operations at Fort Sill support training of personnel in formal artillery school courses, operational joint force training, and service unique continuation training. The applicable instruction is Fort Sill Regulation 385-1, available for download from the Fort Sill web site (http://sill-www.army.mil) in PDF format. Aircrews utilizing the Fort Sill West Range are required to review the regulation before operating within the range airspace. Content and changes to the Army regulation supersede this instruction. Aircrews are responsible for complying with the procedures outlined within the Army directives and all governing regulations. Bring conflicts to the attention of the Air Force 6th CTS Detachment, DSN 639-1766/-3855 or commercial (580) 442-1766/-3855, or Range Control.

7.2.1. Scheduling. Units desiring to schedule range missions for unit level continuation training must realize that Army requirements for use of the range will have priority over aircrew training. To schedule unit level continuation training, contact the Air Force 6th CTS Detachment, DSN 639-1766/-3855 or commercial (580) 442-1766/-3855. This agency will coordinate range times and locations with Range Control, Falcon Range, and ARAC.

7.2.2. Target Area Information. The West Range Impact Area, (for aircraft usage), consists of three CAS target areas, CAS Box 1, CAS Box 2 and CAS Box 3. In addition, dry missions over the Fort Sill Garrison may be conducted in support of various joint training programs.

7.2.2.1. CAS Box 1 is the western target array, with the primary targets located at ND 444394 (N 34º41.750' W 098º30.939').

7.2.2.2. CAS Box 2 is the central target array, with the primary targets located at ND 474378 (N 34º40.865' W 098º28.979').

7.2.2.3. CAS Box 3 is an inert-only target array 1900 meters northeast of CAS Box 2, with the primary targets located at ND 492391 (N 34º41.544' W 098º27.798').

7.2.3. Authorized weapons. Fort Sill Regulation 385-1 provides detailed information on the weapons authorized on the West Range Impact Area. A variety of live, inert and training munitions may be employed on the targets.

7.2.4. Artillery missions may operate simultaneously with fixed-wing operations. Aircrews will adhere to airspace control area lateral and altitude limits if artillery is active when briefed by ARAC, the JTAC, or Range Control.

7.2.5. The approach corridors to Henry Post AAF are located within two NM of West Range. Use caution in the vicinity of Henry Post AAF.

7.2.6. Refer to Attachment 11, Fort Sill Initial/Contact Points and Communication Grid, for a list of initial and contact points and the radio frequencies used at Fort Sill.

7.3. Range Control. Fort Sill Range Control (DSN 639-2994, -2008) is the final approving authority for all operations within R-5601. Aircraft will cease operations and depart restricted airspace immediately upon request from Range Control.

RONALD B. MILLER, Brig Gen, USAFR

Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

NOTE: The user of this instruction is responsible for verifying the currency of the cited documents.

FAA Handbook 7110.65, *Air Traffic Control,* 9 February 2012

FAA Order 7110.65, *Air Traffic Control,* 9 February 2012

AFI 11-MDS Series

AFI 11-202V3, *General Flight Rules,* 22 October 2010

AFI 11-214, *Air Operations Rules and Procedures,* 14 August 2012

AFI 13-112V1, *Joint Terminal Attack Controller (JTAC) Training Program,* 15 February 2008

AFPD 13-2, *Air Traffic, Airfield, Airspace and Range Management,* 7 August 2007

AFI 13-201, *Airspace Management,* 21 Aug 2012

AFI 13-204V3, *Airfield Operations Procedures and Programs,* 1 September 2010

AFI 13-212, *Range Planning and Operations,* 16 November 2007

AFI 13-217, *Drop Zone and Landing Zone Operations,* 10 May 2007

AFI 48-139, *Laser and Optical Radiation Protection Program,* 25 July 2012

AFI 91-202, *US Air Force Mishap Prevention Program,* 5 August 2011

AFI 91-203, *Air Force Consolidated Occupational Safety Instruction,* 15 Jun 2012

AFMAN 33-363, *Management of Records,* 1 March 2008

AFMAN 91-223, *Aviation Safety Investigations and Reports,* 6 July 2004

AFPAM 91-212, *Bird/Wildlife Strike Hazard (BASH) Management Techniques,* 1 February 2004

AFPAM 10-100, *Airman's Manual,* 1 March 2009

AFTTP 3-2.5, *Multi-Service Brevity Codes,* September 2012

AR 385-63, *Range Safety,* 30 January 2012

Fort Sill Supplement 385-1, *Post Range Regulation,* 22 December 2008

Joint Publication 3-09.3, *Close Air Support,* 8 July 2009

Adopted Forms

AF Form 847, *Recommendation for Change of Publication,* 22 September 2009

Abbreviations and Acronyms

AAA – Anti-Aircraft Artillery

AEF – Air and Space Expeditionary Force

AFI – Air Force Instruction

AFRC – Air Force Reserve Command

AGL – Above Ground Level

AHAS – Avian Hazard Advisory System

APC – Armored Personnel Carrier

ATCAA – Air Traffic Control Assigned Airspace

ATIS – Automatic Terminal Information Service

BDU – Bomb, Dummy Unit

CAS – Close Air Support

CCRP – Continuously Computed Release Point

CDT – Central Daylight Time

Comm – Commercial (telephone)

CST – Central Standard Time

DOD – Department of Defense

DODIC – Department of Defense Identification Code

DOL – Directorate of Logistics

DPI – Desired Point of Impact

DSN – Defense Switching Network

EOD – Explosive Ordnance Disposal

EW – Electronic Warfare

FAC – Forward Air Controller

FLIP – Flight Information Publication

FM – Frequency Modulation

GBU – Guided Bomb Unit

GCP – Ground Commanders Pointer

GIS – Geographic Information System

GLTD – Ground Laser Target Designator

HAS – High Angle Strafe

HTE – HARM Threat Emitter

IAM – Inertially Aided Munitions

IED – Improvised Explosive Device

IFR – Instrument Flight Rules

IMC – Instrument Meteorological Conditions

IR – Infrared

IRSSS – Improved Remote Strafe Scoring System

IZLID – Infrared Zoom Laser Illuminator Designator

J-DAM – Joint Direct Attack Munitions

JRB – Joint Reserve Base

JTAC – Joint Terminal Attack Controller

LAS – Low Angle Strafe

LES-M – Laser Evaluator System-Mobile

LGTR – Laser-Guided Training Round

LMR – Land-Mobile Radio

LSDZ – Laser Surface Danger Zone

LSTSS – Large Scale Target Sensor System

LSVRS – Laser Spot Video Recording System

LTA – Laser Training Area

LTL – Laser-to-Target Line

MANPAD – Man-Portable Air Defense

MGRS – Mercator Grid Reference System

MOA – Military Operating Area

MSL – Mean Sea Level

MTR – Military Training Route

NAS – Naval Air Station

NATOPS – Naval Air Training and Operating Procedures Standardization

NOTAM – Notice to Airmen

NVD – Night Vision Device

NVG – Night Vision Goggle

OAP – Offset Aim Point

OP – Observation Point

ORI – Operational Readiness Inspection

PDF – Portable Document Format

POL – Petroleum, Oils and Lubricants

PRF – Pulse Repetition Frequency

RCO – Range Control Officer

RFMSS – Range Facility Management Support System

ROA – Range Operating Authority

ROO – Range Operations Officer

RPA – Remotely Piloted Aircraft

RWT – Radar Warning Transmitter

SDO – Squadron Duty Officer

SOF – Supervisor of Flying

TEL – Transporter-Erector-Launcher

TGP – Targeting Pod

TP – Training Projectile

TPT – Training Projectile - Tracer

TRSA – Terminal Radar Service Area

UHF – Ultra-High Frequency

UTM – Universal Transverse Mercator

UXO – Unexploded Ordnance

VFR – Visual Flight Rules

VHF – Very High Frequency

VMC – Visual Meteorological Conditions

WDZ – Weapons Danger Zone

WGS – World Geodetic System

WISS – Weapons Impact Scoring Set

WP – White Phosphorus - Willie Pete

Terms

NOTE: The purpose of this glossary is to help the reader understand the terms used in this publication. It does not encompass all pertinent terms. Joint Publication 1-02, *DoD Dictionary of Military and Associated Terms*, and AFDD 1-2, *Air Force Glossary,* contain standardized terms and definitions for DoD and USAF use.

Air Traffic Control Assigned Airspace (ATCAA) – Defined airspace normally within the Class A airspace (above 18,000 feet MSL) and established in accordance with FAAO 7610.4 by a LOA with the ATC facility having responsibility for the airspace.

Class A Range – A manned range as defined in AFI 13-212, Range Planning and Operations, where a range control officer is present with two-way radio voice communication capability.

Class B Range – A manned or unmanned range with scoring capability, but no range control officer.

Comprehensive Range Plan (CRP) – The range commander‘s plan, approved by the MAJCOM, that establishes the vision with supporting goals and develops the strategy for attaining the vision through objectives and an implementation approach.

Essential Personnel – Those personnel on a range participating in a test, training or evaluation scenario involving the employment of ordnance (air/surface/sea) including Mission Essential Personnel and those personnel not required for ordnance employment including maneuver elements, opposition forces, instructors, evaluators, etc.

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance. It may also include explosive ordnance that has become hazardous by damage or deterioration.

Guard – A radio frequency that is normally used for emergency transmissions and is continuously monitored. UHF band: 243.0 MHZ; VHF band: 121.5 MHZ.

Hazard Areas – The Hazard Area is a composite of all WDZs and surface danger zones (SDZs) for all authorized weapon delivery events against targets or DPIs approved for actual ordnance expenditures. Public access to Hazard Areas is prohibited unless specifically authorized by the ROA.

Impact Areas – The Impact Area is that area on a range immediately surrounding the target(s) or designated mean point(s) of impact approved for actual ordnance delivery.

Instrument Flight Rules (IFR) – Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

Instrument Meteorological Conditions (IMC) – Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling; less than minimums specified for visual meteorological conditions.

Joint Terminal Attack Controller (JTAC) – An individual qualified IAW JP3-09.3 to provide terminal control for the delivery of weapons by aircraft.

Military Operations Area (MOA) – Airspace designated for nonhazardous military activity, established outside the Class A airspace (below 18,000 feet MSL).

Military Training Route (MTR) – A low-level, high-speed training route established IAW criteria in FAA Joint Order 7610.4, Special Operations. MTRs are used by DoD to conduct low altitude navigation and tactical training, in instrument and visual weather conditions, below an altitude of 10,000 feet MSL and at airspeeds more than 250 KIAS. Routes are established as IFR routes (IR) or VFR routes (VR). The FAA has approval authority to implement IRs and the appropriate MAJCOM approves VR implementation. Environmental documentation is required for implementation IAW AFI 32-7061. VRs are processed through the FAA via the AFREP. MTRs are published in FLIP AP/1B and charted on FAA Sectionals and DoD Low IFR charts. AFREPs assign all route numbers.

Mission Essential Personnel – Those personnel on a range directly required for the employment of ordnance (air/surface/sea) in a test, training or evaluation scenario. This may include JTACs, range control officers, scorers, and any other personnel identified as required.

Night Vision Device (NVD) – Any electro-optical device that is used to detect visible and infrared energy and provide a visible image. Night vision goggles, forward-looking infrared, thermal sights, and low-light level television are night vision devices.

Night Vision Goggles(s) (NVG) – An electro-optical image intensifying device that detects visible and near-infrared energy, intensifies the energy, and provides a visible image for night viewing. Night vision goggles can be either hand-held or helmet-mounted.

Notice to Airman (NOTAM) – A notice containing information concerning the establishment, condition, or change in any aeronautical facility, service, procedures, or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Range Control Officer (RCO) – The person responsible for range operations and safety. Except in situations where the RCO delegates weapons release clearance to a qualified flight lead, individual pilot or Forward Air Controller, or other briefed person.

Remotely Piloted Aircraft (RPA) – An unmanned aircraft flown remotely from a ground or air control station. May also referred to as an unmanned aerial vehicle, or UAV.

Supervisor of Flying (SOF) – A rated officer authorized by the flying unit commander to monitor and supervise current flight operations. A Supervisor of Flying may perform duties from the control tower.

Surface Danger Zones (SDZ) – The ground and airspace designated for vertical and lateral containment of a user-determined percentage of projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of weapon systems including demolitions.

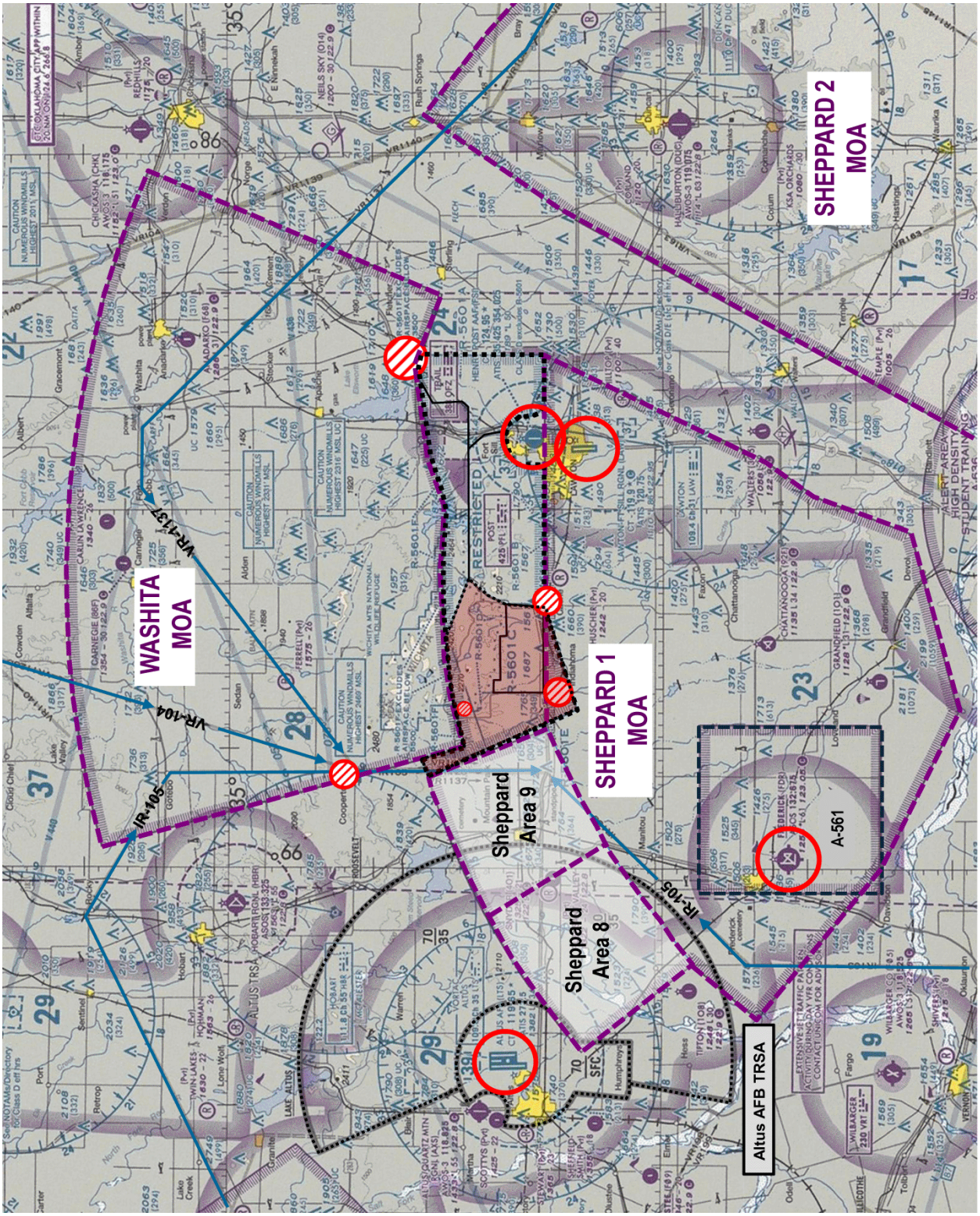
Visual Flight Rules (VFR) – Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Visual Meteorological Conditions (VMC) – Weather conditions in which visual flight rules apply; expressed in terms of visibility, ceiling height, and aircraft clearance from clouds along the path of flight. When these criteria do not exist, instrument meteorological conditions prevail and instrument flight rules must be complied with.

Weapons Danger Zone (WDZ) – The ground and airspace for lateral and vertical containment of a user-determined percentage of projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of aviation delivered ordnance. This three-dimensional zone accounts for weapon accuracy, failures, ricochets, and broaches (resurfacing) of a specific weapon/munitions type delivered by a specific aircraft type. Where software-selectable, this instruction requires 99.9999% containment (1:1,000,000 escapement) or better for all fires, whether SDZs, aviation-delivered gun ammunition, or all other aviation-delivered ordnance, in accordance with Fort Sill Regulation 385-1.

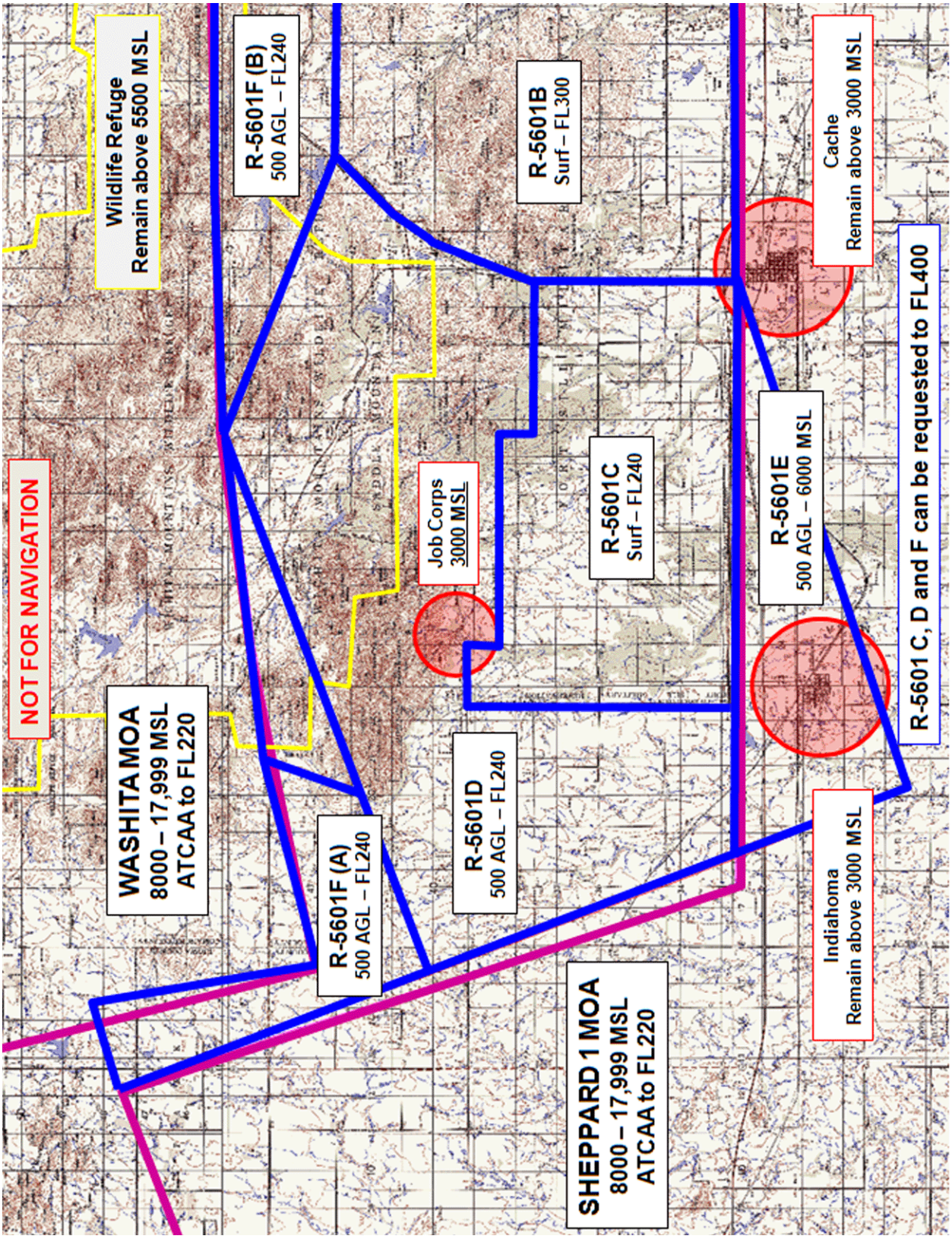
Attachment 2

AERONAUTICAL CHART: FALCON RANGE ENVIRONS



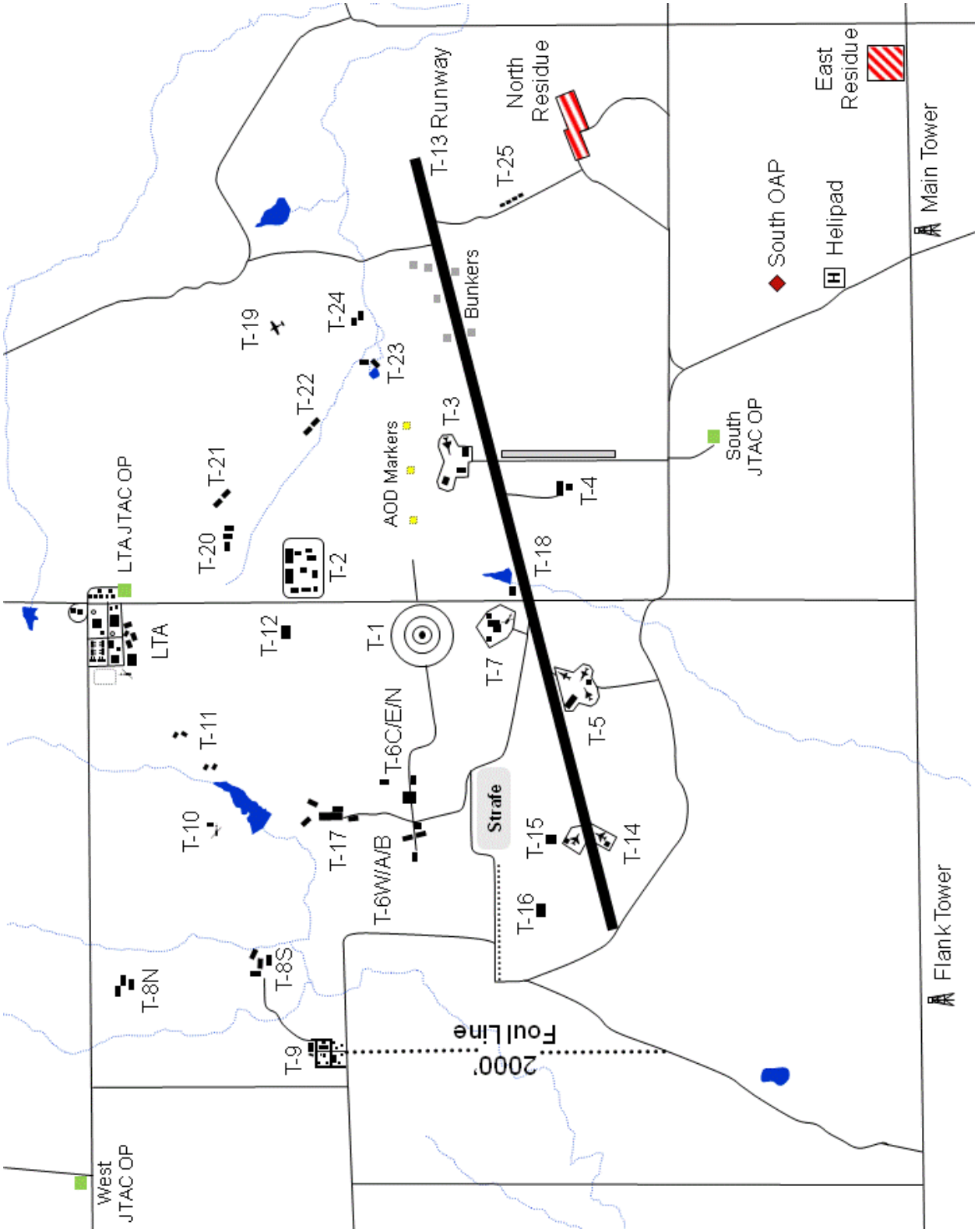
Attachment 3

RESTRICTED AREA R-5601C/D/E/F



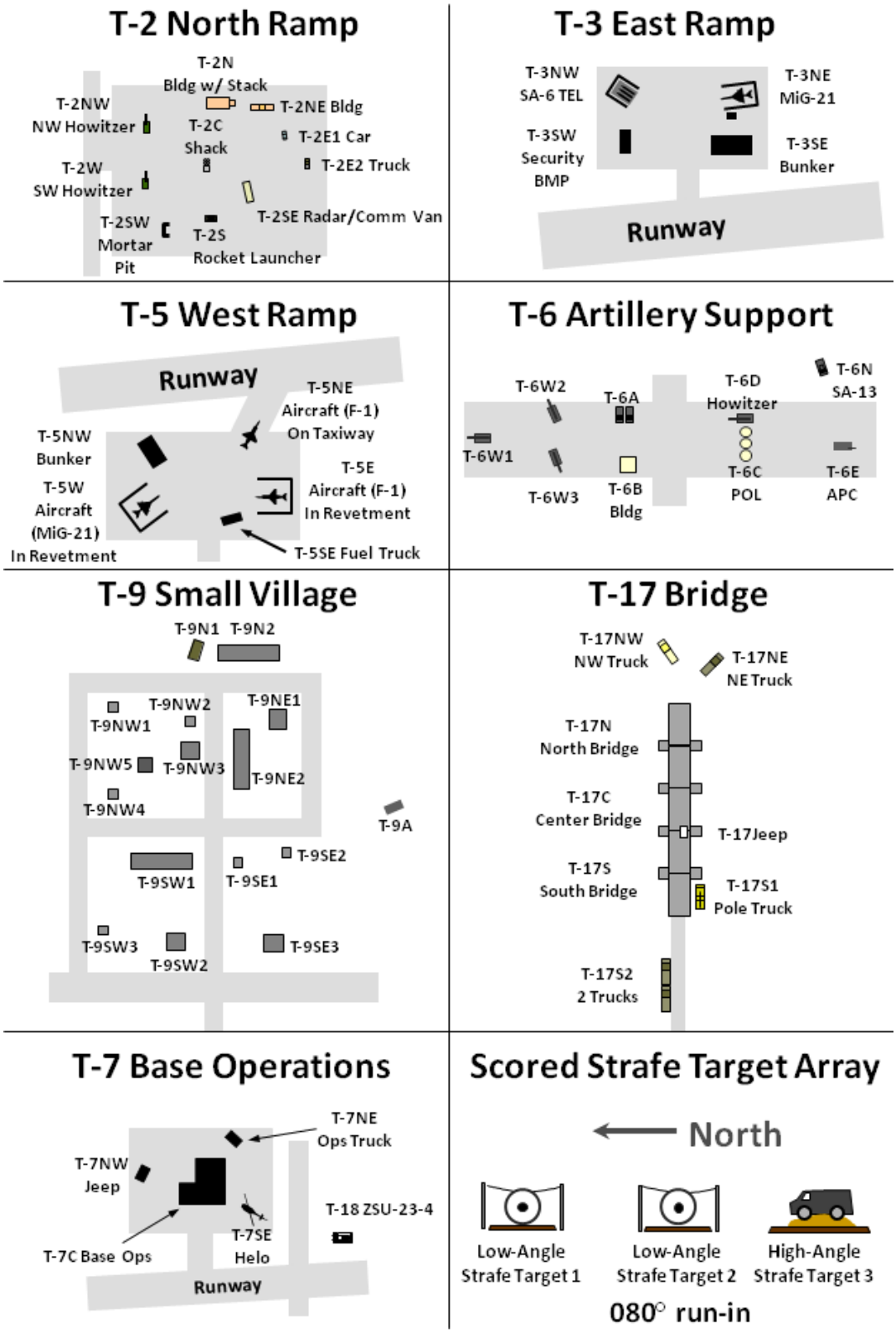
Attachment 4

FALCON RANGE TARGET LAYOUT DIAGRAM



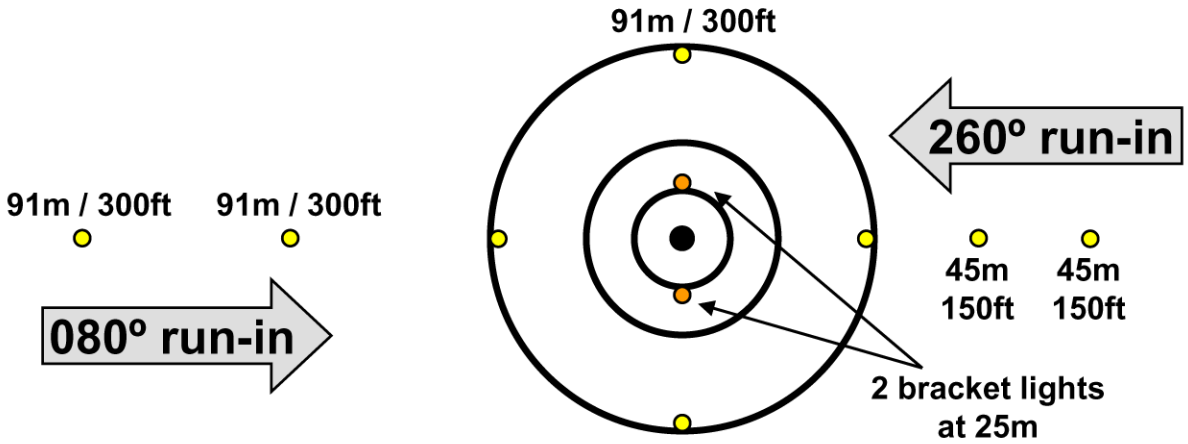
Attachment 5

TARGET ARRAY DETAILS



Attachment 6

FALCON RANGE NIGHT LIGHTING DETAILS



T-1 Bomb Circle Lighting

Attachment 7

MANNED SITES AND OAPs

Manned Sites and OAPs	Description	Latitude	Longitude	MGRS (14S ND)	Elev. (Ft.)
Main Tower	Lighted 75’ Tower and Administration Area.	N 34 38.802	W 098 41.525	28219 33904	1394
Flank Tower	Lighted 85’ Tower 1 NM West of Main Tower.	N 34 38.769	W 098 42.914	26097 33840	1368
Range Residue Storage Area	Fenced area with large building 500 meters east of the Main Tower.	N 34 38.840	W 098 41.206	28705 33980	1370
LTA	Laser training area village “Royville” with numerous targets for lasers only.	N 34 40.009	W 098 42.262	27086 36136	1465
West JTAC OP	OP NW of T-8N and west of LTA by rubble pile. Marked by small building on west side.	N 34 40.070	W 098 43.247	25581 36243	1456
LTA JTAC OP	2-story OP in SE portion of LTA. Part of large east-west CONEX.	N 34 40.000	W 098 42.163	27237 36120	1466
South JTAC OP	OP NW of main operations. Marked by small building on SW side.	N 34 39.100	W 098 41.887	27663 34457	1424
Foul Line Camera Tower	Unlighted guyed 40’ tower on the south end of the foul line. 620 meters NNW of the flank tower.	N 34 39.096	W 098 43.006	25955 34444	1377
NW WISS Score Tower	Unlighted tower with solar panels on south side.	N 34 41.121	W 098 43.430	25297 38185	1524
NE WISS Score Tower	Unlighted tower with solar panels on south side.	N 34 41.228	W 098 41.959	27542 38384	1529
OAP – 1	North Radar Reflector.	N 34 41.203	W 098 41.961	27541 38343	1525
OAP – 2	South Radar Reflector.	N 34 39.016	W 098 41.613	28082 34302	1392

Attachment 8

FALCON RANGE TARGET LIST

A8.1. WGS-84, 15 Aug 2009 Surveys. Verified with GIS imagery 27 Nov 2012.

Table A8.1 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-1	91 meter radius conventional circle w/ inner 23/45 meter circles	N 34 39.545	W 098 42.245	1430	Sub-Scale	27115 35278
T-2N	Stacked and vertically aligned building	N 34 39.744	W 098 42.143	1445	Full-Scale	27271 35645
T-2NE	East-west oriented 4m x 12m building	N 34 39.741	W 098 42.126	1446	Full-Scale	27295 35640
T-2E1	Car on east side of 100m x 85m rectangle	N 34 39.728	W 098 42.117	1443	Full-Scale	27309 35616
T-2E2	Truck on east side of 100m x 85m rectangle	N 34 39.716	W 098 42.109	1443	Full-Scale	27321 35594
T-2S	Rocket Launcher on south side of 100m x 85m rectangle	N 34 39.700	W 098 42.140	1444	Full-Scale	27274 35565
T-2SE	Communications van on southeast corner of 100m x 85m rectangle	N 34 39.707	W 098 42.131	1443	Full-Scale	27288 35578
T-2SW	Mortar Pit on southwest corner of array	N 34 39.695	W 098 42.156	1443	Full-Scale	27250 35555
T-2C	Small building with equipment in center of target array	N 34 39.718	W 098 42.143	1444	Full-Scale	27269 35598

Table A8.2 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-2W	North-south oriented howitzer on west side of 100 x 85 meter rectangle	N 34 39.717	W 098 42.165	1434	Full-Scale	27236 35587
T-3NE	Revetted aircraft on east side of 70 x 80 meter rectangle	N 34 39.505	W 098 41.907	1437	Sub-Scale	27631 35205
T-3NW	SA-11 TEL	N 34 39.508	W 098 41.969	1433	Sub-Scale	27536 35211
T-3SW	Security detail BMP	N 34 39.483	W 098 41.953	1433	Sub-Scale	27561 35164
T-3SE	Hangar on SE side of 70 x 80 meter rectangle	N 34 39.482	W 098 41.917	1435	Sub-Scale	27616 35163
T-4	POL site consisting of 5 horizontal tanks. Specify W or E part of target array w/ RCO	N 34 39.335	W 098 41.983	1415	Sub-Scale	27515 34890
T-4S	POL Support (Jeep and pump house) 25 meters south of T-4	N 34 39.322	W 098 41.980	1415	Sub-Scale	27520 34867
T-5NW	Hangar on NW side of 120 x 100 meter rectangle	N 34 39.323	W 098 42.366	1410	Sub-Scale	26931 34866
T-5W	Aircraft w/ service equipment on west side T-5 array	N 34 39.298	W 098 42.352	1403	Sub-Scale	26952 34821
T-5S	Fuel truck on south side of ramp	N 34 39.288	W 098 42.334	1408	Sub-Scale	26980 34802
T-5E	Alert aircraft on east side of 120 x 100 meter rectangle	N 34 39.299	W 098 42.319	1405	Sub-Scale	27003 34823

Table A8.3 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-6A	Ammunition support	N 34 39.559	W 098 42.592	1427	Sub-Scale	26584 35302
T-6B	Ammunition support structure (small building)	N 34 39.549	W 098 42.589	1428	Sub-Scale	26589 35283
T-6C	POL site consisting of 3 vertical tanks & pump house (west side)	N 34 39.558	W 098 42.552	1430	Sub-Scale	26646 35300
T-6D	M-110 howitzer located immediately north of T-6C	N 34 39.562	W 098 42.551	1429	Sub-Scale	26647 35308
T-6E	Single APC oriented east-west	N 34 39.558	W 098 42.516	1429	Sub-Scale	26701 35300
T-6N	SA-13. Oriented north-south with TEL to the north.	N 34 39.603	W 098 42.517	1430	Sub-Scale	26699 35383
T-6W1	West howitzer in fighting position facing west	N 34 39.550	W 098 42.643	1427	Sub Scale	26507 35285
T-6W2	North howitzer in fighting position facing northwest	N 34 39.559	W 098 42.614	1427	Sub-Scale	26551 35302
T-6W3	South howitzer in fighting position facing southeast	N 34 39.547	W 098 42.612	1427	Sub-Scale	26554 35280
T-7C	Base Operations building. DPI is SW corner.	N 34 39.430	W 098 42.235	1414	Sub-Scale	27130 35065
T-7C	Base Operations building. DPI is SW corner.	N 34 39.430	W 098 42.235	1414	Sub-Scale	27130 35065

Table A8.4 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-7NW	Jeep target NW of Base Operations	N 34 39.437	W 098 42.216	1410	Sub-Scale	27098 35078
T-7NE	Base Ops "Follow Me" Truck	N 34 39.444	W 098 42.227	1409	Sub-Scale	27142 35091
T-7SE	Base Operations Helicopter located 25 meters SE of Base Ops	N 34 39.412	W 098 42.216	1411	Sub-Scale	27159 35032
T-8N	Two groups of armored and service vehicles; array is oriented north-south. Arrays separated by 400 meters.	N 34 40.007	W 098 42.907	1430	Full-Scale	26101 36129
T-8S		N 34 39.788	W 098 42.852	1410	Full-Scale	26186 35724
T-9A	APC located 20 meters east of the main array	N 34 39.677	W 098 42.978	1415	Sub-Scale	25995 35518
T-9N1	Truck. - Oriented North-South, facing South	N 34 39.694	W 098 43.010	1417	Sub Scale	25945 35550
T-9N2	Building, 4m x 13m, oriented east-west	N 34 39.693	W 098 43.002	1418	Sub-Scale	25957 35548
T-9NW1	Shack, 2m x 2m	N 34 39.687	W 098 43.017	1417	Sub-Scale	25935 35536
T-9NW2	Shack, 2m x 2m	N 34 39.687	W 098 43.010	1417	Sub-Scale	25946 35537
T-9NW3	Small Building, 4m x 4m	N 34 39.682	W 098 43.008	1417	Sub-Scale	25948 35528
T-9NW4	Shack, 2m x 2m	N 34 39.677	W 098 43.017	1418	Sub-Scale	25935 35518
T-9NW5	10-meter Lookout Tower	N 34 39.681	W 098 43.015	1420	Sub-Scale	25937 35526
T-9NE1	Small Building, 4m x 4m	N 34 39.686	W 098 42.999	1418	Sub-Scale	25963 35535

Table A8.5 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-9NE2	Building, 4m x 13m, oriented north-south	N 34 39.682	W 098 43.005	1416	Sub-Scale	25953 35527
T-9SE1	Shack, 2m x 2m	N 34 39.670	W 098 43.004	1418	Sub-Scale	25954 35506
T-9SE2	Shack, 2m x 2m	N 34 39.670	W 098 42.998	1417	Sub-Scale	25964 35506
T-9SE3	Small Building, 4m x 4m	N 34 39.661	W 098 42.999	1418	Sub-Scale	25962 35488
T-9SW1	Building, 4m x 13m, oriented east-west	N 34 39.670	W 098 43.014	1416	Sub-Scale	25939 35505
T-9SW2	Small Building, 4m x 4m	N 34 39.664	W 098 43.012	1416	Sub-Scale	25942 35494
T-9SW3	Shack, 2m x 2m	N 34 39.669	W 098 43.022	1418	Sub-Scale	25927 35503
T-10	Helicopter and support vehicle	N 34 39.852	W 098 42.602	1437	Sub-Scale	26568 35843
T-11W	Miscellaneous vehicles	N 34 39.876	W 098 42.476	1434	Sub-Scale	26562 35575
T-11NE	Tech Truck with mounted AAA gun	N 34 39.903	W 098 42.427	1443	Sub-Scale	26833 35955
T-11SE	Truck with rocket launcher	N 34 39.912	W 098 42.428	1444	Sub-Scale	26834 35938
T-12	Reinforced earthen bunker with door on the west face	N 34 39.748	W 098 42.241	1458	Full-Scale	27119 35653
T-13W	East-west runway oriented 07/25. 7400 feet long by 120 feet wide.	N 34 39.251	W 098 42.790	1391	Sub-Scale	26284 34732
T-13E		N 34 39.558	W 098 41.363	1395	Full-Scale GBU	28461 35306

Table A8.6 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-14N	North Alert Ground Attack Aircraft	N 34 39.307	W 098 42.615	1403	Sub-Scale	26543 34836
T-14E	Alert Shack on north side of runway	N 34 39.321	W 098 42.622	1405	Sub-Scale	26540 34862
T-14S	South Alert Ground Attack Aircraft	N 34 39.272	W 098 42.614	1395	Sub-Scale	26543 34836
T-14W	Alert Shack on south side of runway	N 34 39.258	W 098 42.627	1395	Sub-Scale	26533 34745
T-15	23mm AAA Site. Oriented with gun barrels to the west.	N 34 39.346	W 098 42.616	1404	Sub-Scale	26549 34908
T-16A	Fire Can radar van with TTR dish on west face	N 34 39.367	W 098 42.753	1407	Sub-Scale	26340 34946
T-16B	Radar support vehicle (van)	N 34 39.363	W 098 42.749	1407	Sub-Scale	26346 34939
T-17N	North end of bridge	N 34 39.698	W 098 42.579	1440	Sub-Scale	26603 35559
T-17C	Center of bridge with jeep on top in the northbound lane	N 34 39.683	W 098 42.580	1440	Sub-Scale	26602 35532
T-17S	South end of bridge	N 34 39.665	W 098 42.578	1440	Sub-Scale	26606 35497
T-18	ZSU-23-4 by tree and pond	N 34 39.409	W 098 42.172	1410	Sub-Scale	27227 35020
T-19	Downed Aircraft Target	N 34 39.762	W 098 41.684	1442	Sub-Scale	27969 35680
T-20	Construction equipment, 3 vehicles	N 34 39.845	W 098 42.091	1440	Full-Scale	27348 35833
T-21	2 supply trucks	N 34 39.848	W 098 41.995	1439	Full-Scale	27470 35837

Table A8.7 Falcon Range Target List

Target DPI	Description	Latitude	Longitude	Elev. (Ft)	Weapon	MGRS (14S ND)
T-22	Utility truck with AAA piece / dump truck	N 34 39.710	W 098 41.860	1417	Full-Scale	27701 35584
T-23	2 tactical vehicles within revetments	N 34 39.621	W 098 41.749	1404	Full-Scale	27871 35420
T-24	2 tactical vehicles adjacent to tree cluster	N 34 39.634	W 098 41.666	1397	Full-Scale	27998 35445
T-25	Convoy	N 34 39.408	W 098 41.466	1410	20/30 mm	28305 35028
Strafe Target 1	North Low Angle Strafe target	N 34 39.445	W 098 42.584	1413	20/30 mm	26597 35092
Strafe Target 2	South Low Angle Strafe target	N 34 39.423	W 098 42.586	1413	20/30 mm	26595 35051
Strafe Target 3	Scored High Angle Strafe target	N 34 39.410	W 098 42.584	1413	20/30 mm	26597 35027

Table A8.8 Falcon Range Target List

No-Drop Targets	Description	Latitude	Longitude	Elev. (Ft)	MGRS (14S ND)	Notes
North No-Drop Target Array	1crane, 1 BRDM on north side of NW-SE-oriented road	N 34 40.446	W 098 42.052	1438	27404 36944	Located 850 meters NNE of LTA
West No-Drop Target Array	Rocket launcher and support truck oriented east-west	N 34 39.697	W 098 43.246	1433	25584 35554	Located 160 meters W of T-9

No-drop targets are designed for applied tactics (dry/simulated ordnance) and lasers only. No actual weapons of any kind may be employed against them.

Attachment 9

FALCON RANGE ATTACK AXIS MATRIX

Table A9.1. Aircraft: AC-130

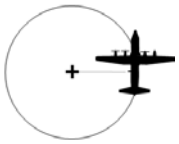
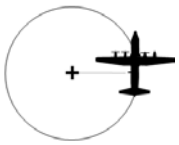
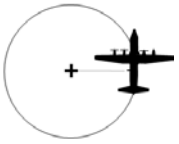
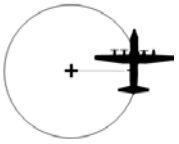
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Firing Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-3. T-4, T-7, T-17, T-18, T-19, strafe pits	25mm	-5º to -45º	3000 to 5000	Orbit	Circling	4,6,7, 8		Do not fire toward any manned sites or the LTA.
All except T-7, T-17, T-19, strafe pits	25mm	-10º to -45º	5000 to 15,000	Orbit	Circling	4,6,7, 8		Do not fire toward any manned sites or the LTA.
T-1 only	40mm	-5º to -45º	3000 to 5000	Orbit	Circling	4,6,7, 8		Do not fire toward any manned sites or the LTA.
All except T-7, T-17, T-19, strafe pits	40mm	-10º to -45º	5000 to 15,000	Orbit	Circling	4,6,7, 8		Do not fire toward any manned sites or the LTA.

Table A9.2. Aircraft: MC-130

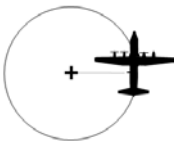
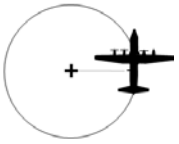
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Firing Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-7, T-17, strafe pits	30mm	-10º to -45º	3000 to 5000	Orbit	Circling	4,6,7, 8		Do not fire toward any manned sites or the LTA.
All except T-7, T-17, strafe pits	30mm	-10º to -45º	5000 to 15,000	Orbit	Circling	4,6,7		Do not fire toward any manned sites or the LTA.

Table A9.3. Aircraft: MV-22/CV-22

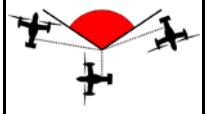
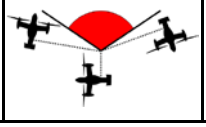
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Firing Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-7, T-17, strafe pits	7.62mm	-5º to -30º	100 to 1000	Sidefire	235° to 105° clockwise	4,6,7		Do not fire toward any manned sites or the LTA.
All except T-7, T-17, strafe pits	.50 cal	-5º to -30º	100 to 1000	Sidefire	235° to 105° clockwise	4,6,7, 8		Do not fire toward any manned sites or the LTA.

Table A9.4. Aircraft: A-10

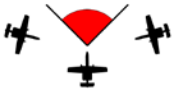
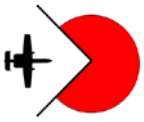
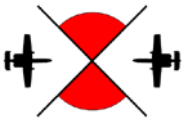
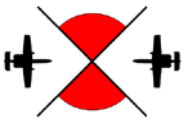
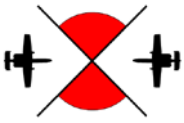
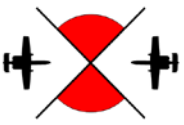
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-25	Sub-scale	0º to -60º	200 to 13,000	Curvilinear Basic	215º to 125º	1,4,6		None
All except T-25	Sub-scale	0º to -60º	200 to 13,000	Pop-Up	015º to 125º	1,2,4, 6		None
All except T-25	Sub-scale	-5º to +45º	200 to 10,000	Loft / Toss	015º to 125º 215º to 325º	1,2,6, 7		Pop-ups from west only.
All except T-25	2.75” Rockets (TP)	0 to -30º No loft	1000 to 15,000	Curvilinear Basic	035º to 125º 215º to 305º	3,4,6, 7		Max dive angle 30º
T-1, T-2, T-6, T-8N, T-8S, T-12, T-17	2.75” Rockets (WP)	0 to -30º No loft	1000 to 15,000	Curvilinear Basic	035º to 125º 215º to 305º	3,4,6, 7		Max dive angle 30º. Targets EOD-restricted.
All except T-7, T-17, T-19	30mm	High Angle -15º to -60º	1500 to 10,000	Curvilinear Basic	035º to 125º 215º to 305º	3,4,6		T-25 east-to-west restricted to 230°-290°.

Table A9.5. Aircraft: A-10

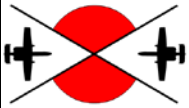
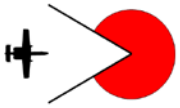
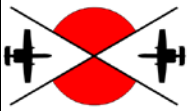
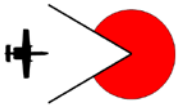
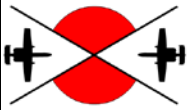
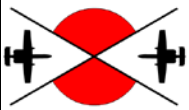
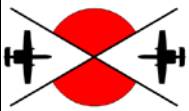
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
High Angle Strafe Target (Acoustic)	30mm	High Angle -15º to -60º	1500 to 10,000	Curvilinear Basic	070º to 090º	4,9		Only on the scored high angle strafe target.
Low Angle Strafe Targets	30mm	Low Angle 0º to -20º	75 to 2000	Curvilinear Basic	070º to 090º	4		Only on the scored low angle strafe targets.
Low Angle Strafe Targets	30mm	Long Range or Two Target 0º to -20º	75 to 5000	Curvilinear Basic	070º to 090º	4		Only on the scored low angle strafe targets.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Full-scale Inert High Drag	0 to -30º No loft	300 to 2000	Curvilinear Basic	050º to 110º 230º to 290º	3,4,5, 6		None
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Full-scale Inert High Drag	0 to -30º No loft	300 to 2000	Pop-Up	050º to 110º 230º to 290º	2,3,4, 5,6		None
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Full-scale Inert Low Drag	0 to -30º No loft	300 to 3000	Curvilinear Basic	050º to 110º 230º to 290º	3,4,5, 6		None
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Full-scale Inert Low Drag	0 to -30º No loft	300 to 3000	Pop-Up	050º to 110º 230º to 290º	2,3,4, 5,6		None
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Full-scale Inert Low Drag	-20º to -60º No loft	2000 to 13,000	Curvilinear Basic	050º to 110º 230º to 290º	3,4,5, 6,7		None
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert GBU-10 GBU-12	0 to -30º No loft	1000 to 5000	Level Dive-Glide	050º to 110º 230º to 290º	3,4,5, 6,7		None
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert GBU-10 GBU-12	0 to -60º No loft	5000 to 15,000	Level Dive-Glide	050º to 110º 230º to 290º	3,4,5, 6,7		None

Table A9.6. Aircraft: F-16

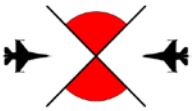
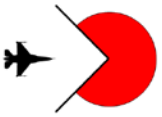
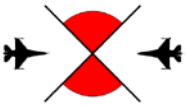
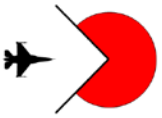
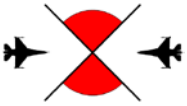
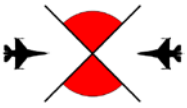
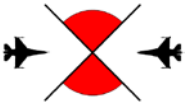
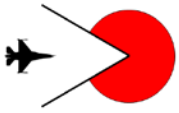
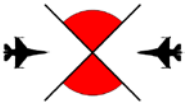
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-25	Sub-scale	+5º to -30º	200 to 5000	Curvilinear Basic	035º to 125º 215º to 305º	1,3,4, 6		None
All except T-25	Sub-scale	+5º to -30º	200 to 5000	Pop-Up Fly-Up	035º to 125º	1,2,3, 4,6		None
All except T-25	Sub-scale	-20º to -60º	5000 to 15,000	Curvilinear Basic	035º to 125º 215º to 305º	1,3,4, 6		None
All except T-25	Sub-scale	-20º to -60º	5000 to 15,000	Pop-Up Fly-Up	035º to 125º	1,2,3, 4,6		None
All except T-25	Sub-scale	-5º to +45º	500 to 5000	Loft Toss	035º to 125º 215º to 305º	1,2,3, 4,6,7		Loft/LAT pop-up or fly-up restricted to west-east
All except T-25	2.75” Rockets (TP)	0 to -30º No loft	1000 to 15,000	Curvilinear Basic	035º to 125º 215º to 305º	3,4,6, 7		Max dive angle 30º
T-1, T-2, T-6, T-8N, T-8S, T-12, T-17	2.75” Rockets (WP)	0 to -30º No loft	1000 to 15,000	Curvilinear Basic	035º to 125º 215º to 305º	3,4,6, 7		Max dive angle 30º
T-1, T-2, T-12, T-20 thru T-24	2.75” Rockets (TP / WP)	0 to +45	500 to 5000	Loft	050º to 110º	2,3,4, 6,7		WP loft rounds restricted to T-1, T-2 and T-12 only
All except T-7, T-17, T-19.	20mm	-15º to -60º	1000 to 10,000	High Angle Strafe	035º to 125º 215º to 305º	3,4,6		T-4. T-5, T-14, T-15, T-16 east-to-west: 230º to 290º

Table A9.7. Aircraft: F-16

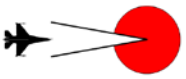
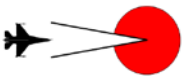
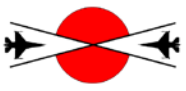
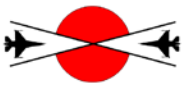
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
High Angle Strafe Target (Acoustic)	20mm	-15º to -60º	1000 to 10,000	High Angle Strafe	070º to 090º	4, 9		Only on the scored high angle strafe target.
Low Angle Strafe Targets (Acoustic)	20mm	0º to -20º	75 to 2000	Low Angle Strafe	070º to 090º	4		Only on the scored low angle strafe targets.
T-2, T-8S, T-12, T-20 thru T-24	Inert MK-82 AIR HD	0º to -15º	200 to 2500	Curvilinear Basic Pop-up	060º to 100º 240º to 280º	2,4,5, 6,8		Prohibited east-to-west on T-8S.
T-2, T-8S, T-12, T-20 thru T-24	Inert MK-82 AIR HD	-10º to -30º	300 to 3000	Curvilinear Basic Pop-up	050º to 110º 230º to 290º	2,4,5, 6,8		Prohibited east-to-west on T-8N.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD	0 to -10º	500 to 3000	Curvilinear Basic Pop-up	065º to 095º 245º to 275º	2,3,4, 5,6,8		Prohibited east-to-west on T-8N and T-8S
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD	0º to -30º	1000 to 5000	Curvilinear Basic Pop-up	050º to 110º 230º to 290º	2,3,4, 5,6,8		Prohibited east-to-west on T-8N and T-8S
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD	-5º to +45º	1000 to 5000	Loft Low Alt. Toss	050º to 110º 230º to 290º	2,3,4, 5,6,7, 8		Maximum LAT/LOFT range of 4 nm.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD MK-84 LD	-15º to -60º	2000 to 15,000	Curvilinear Basic	050º to 110º 230º to 290º	2,3,4, 5,6,8		None.
T-2, T-8S, T-12, T-20 thru T-24	Inert MK-84 AIR HD	0º to -15º	200 to 2500	Curvilinear Basic Pop-up	065º to 095º 245º to 275º	2,4,5, 6,8		Prohibited east-to-west T-2, T-12, T-8S, T-20.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-84 AIR HD	-10º to -30º	300 to 3000	Curvilinear Basic Pop-up	065º to 095º 245º to 275º	2,3,4, 5,6,8		Prohibited east-to-west on T-8N/S, T-20, T-21, T-24.

Table A9.8. Aircraft: F-16

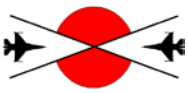
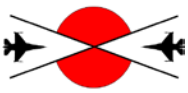
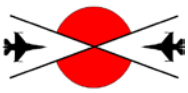
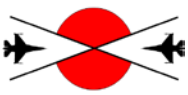
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-2, T-8S, T-12, T-20 thru T-24	Inert MK-84 LD	0º to -10º	500 to 3000	Curvilinear Basic Pop-up	065º to 095º 245º to 275º	2,4,5, 6,8		Prohibited east-to-west T-2, T-12, T-8S, T-20, T-21
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-84 LD	0º to -30º	1000 to 5000	Curvilinear Basic Pop-up	050º to 110º 230º to 290º	2,3,4, 5,6,8		None.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-84 LD	-5º to +45º	1000 to 5000	Loft Low Alt. Toss	050º to 110º 230º to 290º	2,3,4, 5,6,7, 8		Maximum LAT/LOFT range of 4 nm.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert GBU-10	0º to -30º	2000 to 5000	Level Dive	060º to 100º 240º to 280º	3,4,5, 6,7,8		Prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert GBU-10	0º to -30º	5000 to 15,000	Level Dive-Glide	060º to 100º 240º to 280º	3,4,5, 6,7,8		Prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24, T-13 MVR	Inert GBU-12	0º to -30º	2000 to 5000	Level Dive	060º to 100º 240º to 280º	3,4,5, 6,7,8		Prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert GBU-12	0º to -30º	5000 to 15,000	Dive-Glide	060º to 100º 240º to 280º	3,4,5 6,7,8		Prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24, T-13 MVR	Inert GBU-12	0º to -15º	5000 to 15,000	Level Dive	060º to 100º 240º to 280º	3,4,5, 6,7,8		Prior coordination required.

Table A9.9. Aircraft: F/A-18

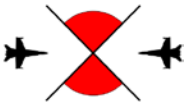
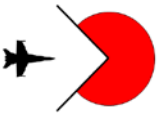
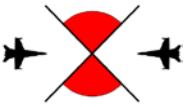
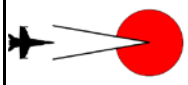
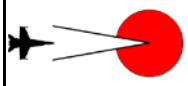
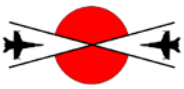
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-25	Sub-scale	0 to -60º	300 to 18,000	Curvilinear Basic	035º to 125º 215º to 305º	1,3,4, 6		None
All except T-25	Sub-scale	0 to -60º	300 to 18,000	Pop-Up Fly-Up	035º to 125º	1,2,3, 4,6		None
All except T-25	Sub-scale	0 to +45º	500 to 5000	Loft / Toss	035º to 125º 215º to 305º	1,2,3, 4,6		None
All except T-7, T-17, T-19	20mm	High Angle -15º to -60º	1000 to 10,000	High Angle Strafe	035º to 125º 215º to 305º	3,4,6		T-4, T-5, T-14, T-15, and T-16 east-to-west restricted to 250º to 290º
High Angle Strafe Target (Acoustic)	20mm	-15º to -60º	1000 to 10,000	High Angle Strafe	070º to 090º	4, 9		Only on the scored high angle strafe target.
Low Angle Strafe Targets	20mm	Low Angle 0º to -20º	75 to 2500	Low Angle Strafe	070º to 090º	4		Only on low angle strafe targets.
T-2, T-6, T-8N/S, T-9, T-12, T-17, T-20 thru T-24	LGTR	0º to -30º	2000 to 5000	Level Dive-Glide	050º to 110º 230º to 290º	2,3,4, 5,6,8		Prior coordination required.
T-2, T-6, T-8N/S, T-9, T-12, T-17, T-20 thru T-24	LGTR	0º to -30º	5000 to 15,000	Level Dive-Glide	065º to 095º 245º to 275º	2,3,4, 5, 6,7,8		Prohibited west-to-east on T-8N, T-8S, and T-9.
T-2, T-8N, T-8S, T-12, T-20 thru T-24, T-13 MVR	Inert GBU-10 GBU-12 GBU-16	0 to -30º	2000 to 5000	Low-Level Dive-Glide	060º to 100º 240º to 280º	3,4,5, 6,7,8		Prior coordination required T-8N and T-8S west-to-east.

Table A9.10. Aircraft: F/A-18

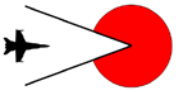
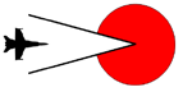
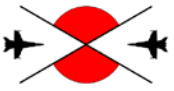
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-2, T-8N, T-8S, T-12, T-20 thru T-24, T-13 MVR	Inert GBU-10 GBU-12 GBU-16	0º to -30º	5000 to 15,000	Medium Altitude Level-Dive	060º to 100º 240º to 280º	3,4,5, 6,7,8		Prior coordination required.
T-2, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-83 AIR HD	0º to -15º	300 to 2000	Level High Drag	060º to 100º 240º to 280º	2,3,4 5,6,7, 8		Prohibited east-to-west T-8S, prior coordination required.
T-2, T-8S	Inert MK-84 AIR HD	0º to -15º	300 to 2000	Level High Drag	060º to 100º	2,3,4, 5,6,7, 8		West-to-east only, prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-83 AIR HD	0º to -30º	500 to 2500	Low Altitude High-Drag	060º to 100º 240º to 280º	2,3,4, 5,6,7, 8		Prohibited east-to-west T-8N, prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-84 AIR HD	0º to -30º	500 to 2500	Low Altitude High-Drag	060º to 100º 240º to 280º	2,3,4, 5,6,7, 8		Prohibited east-to-west T-8N, T-8S.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-83 LD	0º to -10º	500 to 3000	Curvilinear Basic Pop-up	065º to 095º 245º to 275º	2,3,4, 5,6,8		Prior coordination required. Prohibited east-to-west T-8N, T-8S.
T-2, T-12, T-23, T-24	Inert MK-84 LD	0º to -10º	500 to 3000	Curvilinear Basic Pop-up	065º to 095º	2,3,4, 5,6,8		Prior coordination required. No east-to-west attacks.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-83 MK-84 LD	0º to -30º	1000 to 5000	Curvilinear Basic Pop-up	050º to 110º 230º to 290º	2,3,4, 5,6,7, 8		Prior coordination required.

Table A9.11. Aircraft: F/A-18

Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-83 MK-84 LD	-5º to +45º	1000 to 5000	LAT Loft	050º to 110º 230º to 290º	2,3,4, 5,6,7, 8		Prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-83 MK-84	-20º to -60º	2000 to 15,000	Curvilinear Basic Pop-up	050º to 110º 230º to 290º	2,3,4, 5,6,7		Prior coordination required.
All except T-4, T-5, T-25	5” Rockets (TP)	0 to -30º No loft	1000 to 5000	Curvilinear Basic	050º to 110º 230º to 290º	3,4,6, 7,8		Prior coordination required.
All except T-4, T-5, T-25	5” Rockets (TP)	0 to -60º No loft	5000 to 15,000	Curvilinear Basic	050º to 110º 230º to 290º	3,4,6, 7,8		Prior coordination required.

Table A9.12. Aircraft: B-1

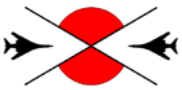
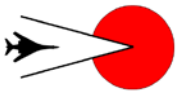
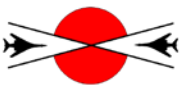
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-25	Sub-scale	0º to -5º	300 to 3000	Low Level	050º to 110º 230º to 290º	1,4,6, 7		Do not exceed 650 KTAS at release
T-2, T-8S, T-12, T-22, T-23	Inert MK-82 AIR HD	0º to -5º	300 to 3000	Low Level	065º to 095º	1,4,5 6,8		All events require closure of eastern training areas
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD MK-84 LD	0º to -5º	5000 to 15,000	Medium Altitude Level	065º to 095º 245º to 275º	1,4,5, 6,7		Do not exceed 650 KTAS at release

Table A9.13. Aircraft:B-2

Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD	0º	500 - 5000	Low Level	065º to 095º 245º to 275º	4,5,6, 7,8		Prior coordination required.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD MK-84 LD	0º	5000 to 15,000	Medium Altitude Level	065º to 095º 245º to 275º	4,5,6 7,8		600 KTAS max at release

Table A9.14. Aircraft: B-52

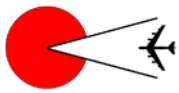
T-8N, T-8S	Inert MK-82 AIR HD	0º	500 to 3000	Low Level	065º to 095º 245º to 275º	4,5,6, 8		Prohibited east-to-west T-8N, T-8S, T-21, and T-24.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD	0º	500 to 5000	Low Level	065º to 095º 245º to 275º	4,5,6, 7,8		Prohibited east-to-west T-8N. Prior coordination.
T-2, T-8S, T-12, T-20 thru T-24	Inert MK-82 LD	0º	500 to 5000	Low Level	065º to 095º 245º to 275º	4,5,6, 7,8		Prohibited east-to-west T-2, T-8S, T-12, and T-20.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-84 LD	0º	5000 to 15,000	Medium-Altitude Level	065º to 095º 245º to 275º	4,5,6, 7,8		Prior coordination required for eastern airspace.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert MK-82 MK-84 LD	0º	16,500 MSL to 24,000 MSL	High-Altitude Level	245º to 275º	4,5,6, 7,8		Prior coordination required for eastern airspace.
T-2, T-8N, T-8S, T-12, T-20 thru T-24	Inert GBU-10 GBU-12	0º	5000 to 15,000	Medium-Altitude Level	065º to 095º 245º to 275º	4,5,6, 7,8		Prior coordination required.

Table A9.15. Aircraft: AH-64

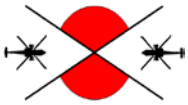
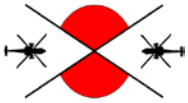
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-4, T-7, T-17, T-19, strafe pits	30mm	+5º to -30º	50 to 1000	Level	050º to 110º 230º to 290º	4,6,7, 8		Prior coordination required.
All except T-25	2.75” Rockets	+10º to -30º	50 to 1000	Level	050º to 110º 230º to 290º	4,6,7, 8		T-4, T-13: South OP cannot be manned.

Table A9.16. Aircraft: AH-6, OH-58

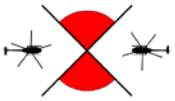
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Firing Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-7, T-17, T-19, T-25, strafe pits	.50 cal	0º to -30º	100 to 1000	Level Dive	035º to 125º 215º to 305º	4,6,7		Prior coordination required.
All except T-25	2.75” Rockets	+15º to -30º	100 to 1000	Level Loft Dive	035º to 125º 215º to 305º	4,6,7		Prior coordination required.

Table A9.17. Aircraft: MH-60

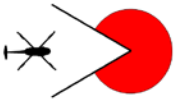
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Firing Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-1, T-2, T-3, T-6, T-8N, T-8S, T-9, T-25	30mm	+5º to -30º	50 to 1000	Fixed-Mount Strafe	050º to 110º	4,6,7, 8		Prior coordination required.

Table A9.18. Aircraft: Helicopter Sidefire (HH/MH-53, UH/MH/SH-60, MH/CH-47, UH-1, CH-146)

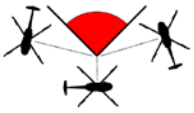
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
All except T-7, T-17, T-19, T-25, strafe pits	7.62mm	-5º to -30º	25 to 500	Level Dive	225º to 105º (350º ± 115º)	4,6,7		Do not fire toward any manned sites or the LTA.

Table A9.19. Aircraft: Remotely Piloted Aircraft [RPAs] (MQ-1, MQ-9)

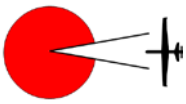
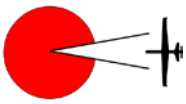
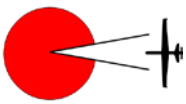
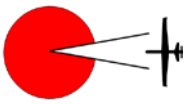
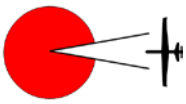
Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-2	Inert GBU-12 (MQ-9)	0º to -5º	5000 to 20,000	Level Dive	050º to 110º 230º to 290º	4,7		None.
T-2	Inert GBU-38 (MQ-9)	0º to -5º	5000 to 10,000	Level Dive	250º to 270º (Offset L/R ± 10º)	4,7,8		Release range: 0.75 to 4.5 NM. Prior coordination/ closures required.
T-2	Inert GBU-38 (MQ-9)	0º to -5º	10,000 to 15,000	Level Dive	250º to 270º (Offset L/R ± 10º)	4,7,8		Release range: 1.5 to 6.0 NM. Prior coordination/ closures required.
T-2	Inert GBU-38 (MQ-9)	0º to -5º	15,000 to 20,000	Level Dive	250º to 270º (Offset L/R ± 10º)	4,7,8		Release range: 1.5 to 8.0 NM. Prior coordination/ closures required.

Table A9.20. Aircraft: Remotely Piloted Aircraft [RPAs] (MQ-1, MQ-9)

Target	Weapon	Release Angle	Release Altitude (AGL)	Pattern	Run-In Heading	Notes	Attack Axis Graphic	Additional Restrictions
T-2	Inert GBU-44 (MQ-1)	0º to -5º	5000 to 10,000	Level Dive	250º to 270º (Offset L/R ± 10º)	4,7,8		Release range: 0.1 to 3.25 NM. Prior coordination/ closures required.
T-2	Inert GBU-44 (MQ-1)	0º to -5º	10,000 to 15,000	Level Dive	250º to 270º (Offset L/R ± 10º)	4,7,8		Release range: 0.1 to 5.0 NM. Prior coordination/ closures required.

Notes:

1. Sub-scale munitions include BDU-33, MK-76, etc.

2. Low-altitude ingress and pop-up or fly-up is restricted to west-to-east (080º) run-in headings.

3. Short distance from south boundary to target areas precludes north roll-in.

4. Do not over fly main or flank tower; do not release weapons when pointing at main or flank tower.

5. Heavyweight munitions, delivered from shallow dive angles, travel as far as 3000 meters and can change direction by as much as 30°after breaching.

6. These restrictions may be modified with the concurrence of Falcon Range after computing weapons footprints using the ACC-approved footprint program.

7. Ensure releases take place within the restricted airspace.

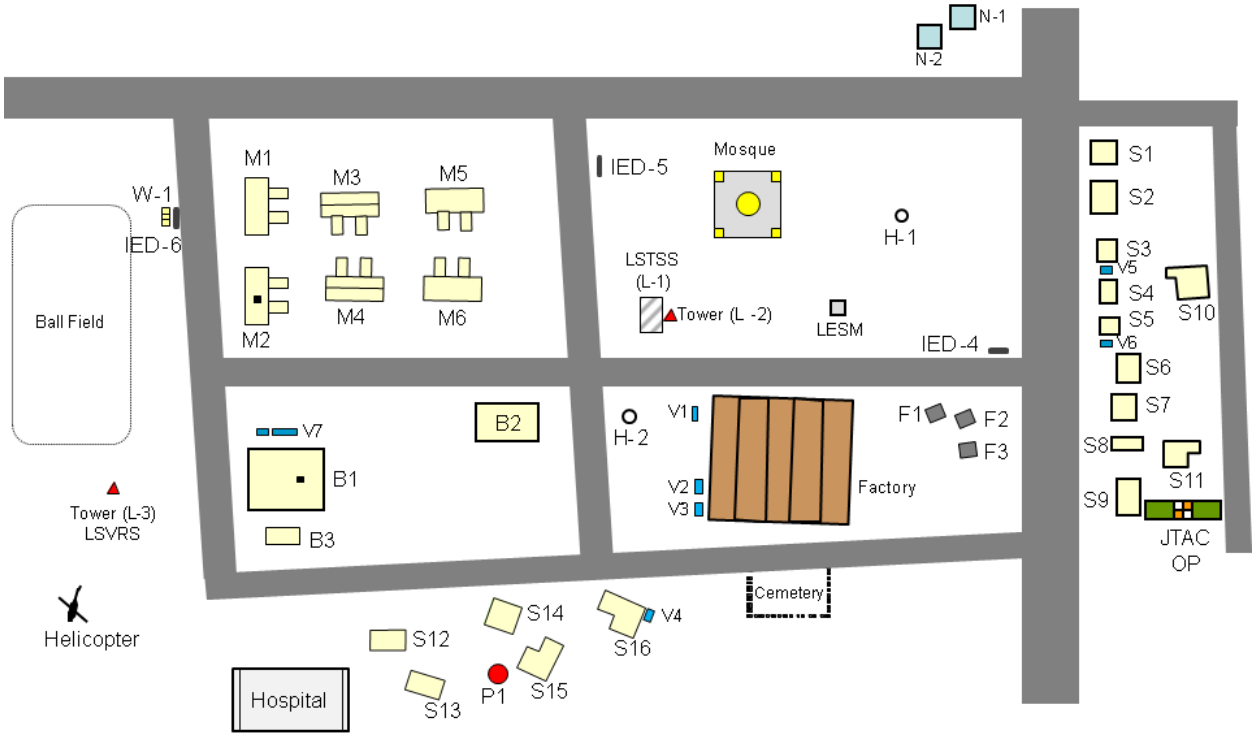
8. Some weapons events place the weapons danger zones outside the impact area. These events can still be performed but prior coordination (as much as 8 weeks) is required with Fort Sill in order to allow the events. Users must call the range in advance to ensure the adjacent training areas are clear.

9. High-angle strafe on the scored HAS target is restricted to 080º ± 10º.

Attachment 10

LASER SCORING MATRIX

Table A10.1. Laser Scoring Matrix



Name	Description	Latitude/ Longitude	Elev.	MGRS	Scoring Sensor	Required LTL
Hospital	Rectangular Hospital	N 34 39.983 W 098 42.299	1469	27030 36087	None	Any
Factory	West Center Window	N 34 40.010 W 098 42.23	1462	27130 36137	3	090º ± 60º
Mosque	Mosque w/ Minarets	N 34 40.035 W 098 42.233	1469	27130 36183	None	Any
L-1	LSTSS Support	N 34 40.022 W 098 42.236	1465	27126 36159	None	Any
L-2	LSTSS Camera Tower	N 34 40.023 W 098 42.235	1465	27127 36161	None	Any
L-3	LSTSS Camera Tower	N 34 40.002 W 098 42.319	1452	26999 36122	None	Any
LES-M	Laser Evaluator System	N 34 40.024 W 098 42.214	1472	27159 36163	Self	Any
JTAC OP	Orange and White OP	N 34 40.001 W 098 42.169	1466	27228 36120	None	Any

Table A10.2. Laser Scoring Matrix

Name	Description	Latitude/ Longitude	Elev.	MGRS	Scoring Sensor	Required LTL
IED-4	Artillery Shells Partially Buried	N 34 40.018 W 098 42.196	1465	25187 36152	1	080º ± 60º
IED-5	Artillery Shells Partially Buried	N 34 40.034 W 098 42.246	1470	27111 36181	None	Any
IED-6	Artillery Shells Buried by W-1	N 34 40.035 W 098 42.306	1471	27019 36184	None	Any
S1	Northern Shanty Row	N 34 40.042 W 098 42.180	1470	27211 36196	1	080º ± 60º
S2	Shanty	N 34 40.037 W 098 42.181	1471	27210 36187	1	080º ± 60º
S3	Shanty	N 34 40.032 W 098 42.181	1471	27210 36178	1	080º ± 60º
S4	Shanty	N 34 40.027 W 098 42.180	1471	27211 36169	1	080º ± 60º
S5	Shanty	N 34 40.021 W 098 42.179	1472	27213 36158	1	080º ± 60º
S6	Shanty	N 34 40.017 W 098 42.178	1472	27214 36150	1	080º ± 60º
S7	Shanty	N 34 40.013 W 098 42.179	1473	27213 36143	1	080º ± 60º
S8	Shanty	N 34 40.008 W 098 42.179	1472	27213 36134	1	080º ± 60º
S9	Southern Shanty Row	N 34 40.001 W 098 42.177	1472	27216 36121	1	080º ± 60º
S10	Northeastern Shanty	N 34 40.024 W 098 42.164	1470	27236 36163	None	Any
S11	Southeastern Shanty	N 34 40.006 W 098 42.169	1470	27228 36130	None	Any
S12	2-Story Shanty Bldg	N 34 39.987 W 098 42.277	1465	27063 36094	2 LSVRS	200º ± 60º 090º ± 80º
S13	1-Story Shanty	N 34 39.983 W 098 42.272	1465	27071 36087	2 LSVRS	200º ± 60º 090º ± 80º
S14	Larger 1-Story Bldg	N 34 39.989 W 098 42.260	1466	27089 36098	2 LSVRS	200º ± 60º 090º ± 80º
S15	1+2 Story Shanty	N 34 39.985 W 098 42.256	1465	27095 36091	2 LSVRS	200º ± 60º 090º ± 80º

Table A10.3. Laser Scoring Matrix

Name	Description	Latitude/ Longitude	Elev.	MGRS	Scoring Sensor	Required LTL
S16	Long 1+2 Story Bldg	N 34 39.989 W 098 42.245	1466	27112 36098	2 LSVRS	200º ± 60º 090º ± 80º
P1	Red POL Tank	N 34 39.980 W 098 42.261	1469	27088 36081	2	200º ± 60º
H-1	NE Spider Hole	N 34 40.028 W 098 42.202	1476	27177 36170	1	080º ± 60º
H-2	SW Spider Hole	N 34 40.010 W 098 42.243	1469	27115 36137	2	200º ± 60º
F1	NW Support Bldg	N 34 40.012 W 098 42.203	1466	27176 36141	None	Any
F2	Center Support Bldg	N 34 40.011 W 098 42.197	1467	27185 36139	None	Any
F3	SE Support Bldg	N 34 40.006 W 098 42.197	1466	27185 36130	None	Any
W-1	Shack at Ball Field	N 34 40.031 W 098 42.301	1470	27026 36176	None	Any
B-1	West Gen Purpose Bldg	N 34 40.006 W 098 42.297	1472	27033 36129	LSVRS	090º ± 80º
B-1 Top	Top-Down Target on B-1	N 34 40.006 W 098 42.293	1481	27039 36132	LSVRS	090º ± 80º
B-2	East Gen Purpose Bldg	N 34 40.012 W 098 42.263	1469	27084 36141	LSVRS	090º ± 80º
B-3	Small Building (Snack Bar)	N 34 39.998 W 098 42.295	1474	27036 36115	LSVRS	090º ± 80º
V-1	North Vehicle (Service Cart)	N 34 40.011 W 098 42.234	1469	27129 36139	LSVRS	090º ± 80º
V-2	Central Vehicle (Heavy Equip.)	N 34 40.000 W 098 42.234	1470	27129 36119	LSVRS	090º ± 80º
V-3	South Vehicle (Wreck)	N 34 39.996 W 098 42.235	1471	27127 36111	LSVRS	090º ± 80º
V-4	Small Auto by S-16 Building	N 34 39.989 W 098 42.239	1474	27121 36098	2	200º ± 60º
V-5	North Shanty Row – Blazer	N 34 40.026 W 098 42.177	1474	27216 36167	1	080º ± 60º
V-6	Center Shanty Row - Truck	N 34 40.020 W 098 42.177	1474	27216 36156	1	080º ± 60º

Table 10.4. Laser Scoring Matrix

Name	Description	Latitude/ Longitude	Elev.	MGRS	Scoring Sensor	Required LTL
V-7	Truck With Trailer by B-1	N 34 40.007 W 098 42.289	1476	27045 36132	LSVRS	090º ± 80º
N-1	Northeast Shack	N 34 40.065 W 098 42.210	1476	27165 36239	None	Any
N-2	Southwest Shack	N 34 40.059 W 098 42.212	1476	27162 36228	None	Any
M1	Northwest Marketplace Building	N 34 40.035 W 098 42.293	1476	27038 36183	LSVRS	090º ± 80º
M2	Southwest Marketplace Building	N 34 40.023 W 098 42.294	1476	27037 36161	LSVRS	090º ± 80º
M2 Top	Top-Down Target on M2	N 34 40.024 W 098 42.293	1480	27038 36162	LSVRS	090º ± 80º
M3	North-Central Marketplace Building	N 34 40.034 W 098 42.279	1479	27060 36181	LSVRS	090º ± 80º
M4	South-Central Marketplace Building	N 34 40.025 W 098 42.280	1479	27058 36165	LSVRS	090º ± 80º
M5	Northeast Marketplace Building	N 34 40.035 W 098 42.266	1478	27080 36183	None	Any
M6	Southeast Marketplace Building	N 34 40.023 W 098 42.268	1478	27077 36161	None	Any
Helo-1	Helicopter	N 34 39.987 W 098 42.325	1472	26990 36094	None	Any

Attachment 11

FORT SILL INITIAL/CONTACT POINTS AND COMMUNICATION GRID

NAME	GRID LOCATION	LAT/LONG	DESCRIPTION
CP Standpipe	ND 115323	N 34º 37.970’ W 098º 52.470’	Standpipe SW of US 62 and OK 54 intersection
CP Lima (L)	ND 446476	N 34º 46.174' W 098º 30.757'	North end of Lake Lawtonka, IRW (CH 88) 226056
CP Romeo (R)	ND 356260	N 34º 34.510' W 098º 36.712'	SPS (CH 74) 350035
IP Bravo (B)	ND 271352	N 34º 39.503' W 098º 42.255'	Bomb circle on Falcon Range
IP Kilo (K)	ND 372405	N 34º 42.352' W 098º 35.627'	Ketch Lake
Point Sierra (S)	ND 467370	N 34º 40.435' W 098º 29.415'	Signal Mountain
Point Alpha (A)	ND 392340	N 34º 38.830' W 098º 34.335'	Two adjacent ponds
IP November (N)	ND 361376	N 34º 40.785' W 098º 36.355'	Small lake
Grid Zone Origin (14S ND, WGS 84) = N 34º 20.584' / W 099º 00.000'.			

ORGANIZATION	FREQUENCIES
CAS Control Frequency (West Range)	356.5 (P) / 344.5 (S)
Fort Sill Approach IFR Clearance/Service/ VFR Flight Following	322.4 / 120.55 (P) 307.275 / 127.3 (S)
Range Control	34.50 (FM) 38.50 (FM)
Fort Sill ATIS	241.0 / 135.425
Fort Sill METRO	375.2
Falcon Range	363.7 (P) / 342.3 (S) / 238.8 (T)
Altus Approach	257.725 / 125.1 (P) 350.35 Fort Worth Center (S)